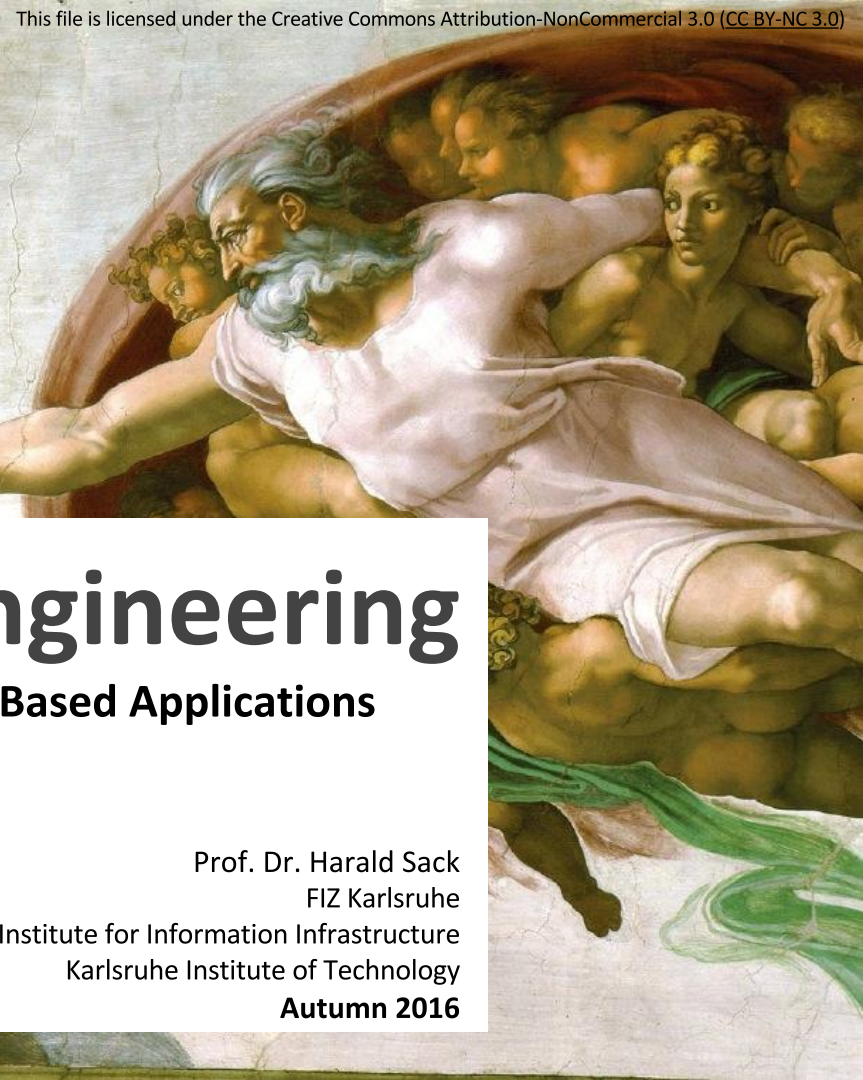




Lecture 6: Advanced Linked Data Based Applications

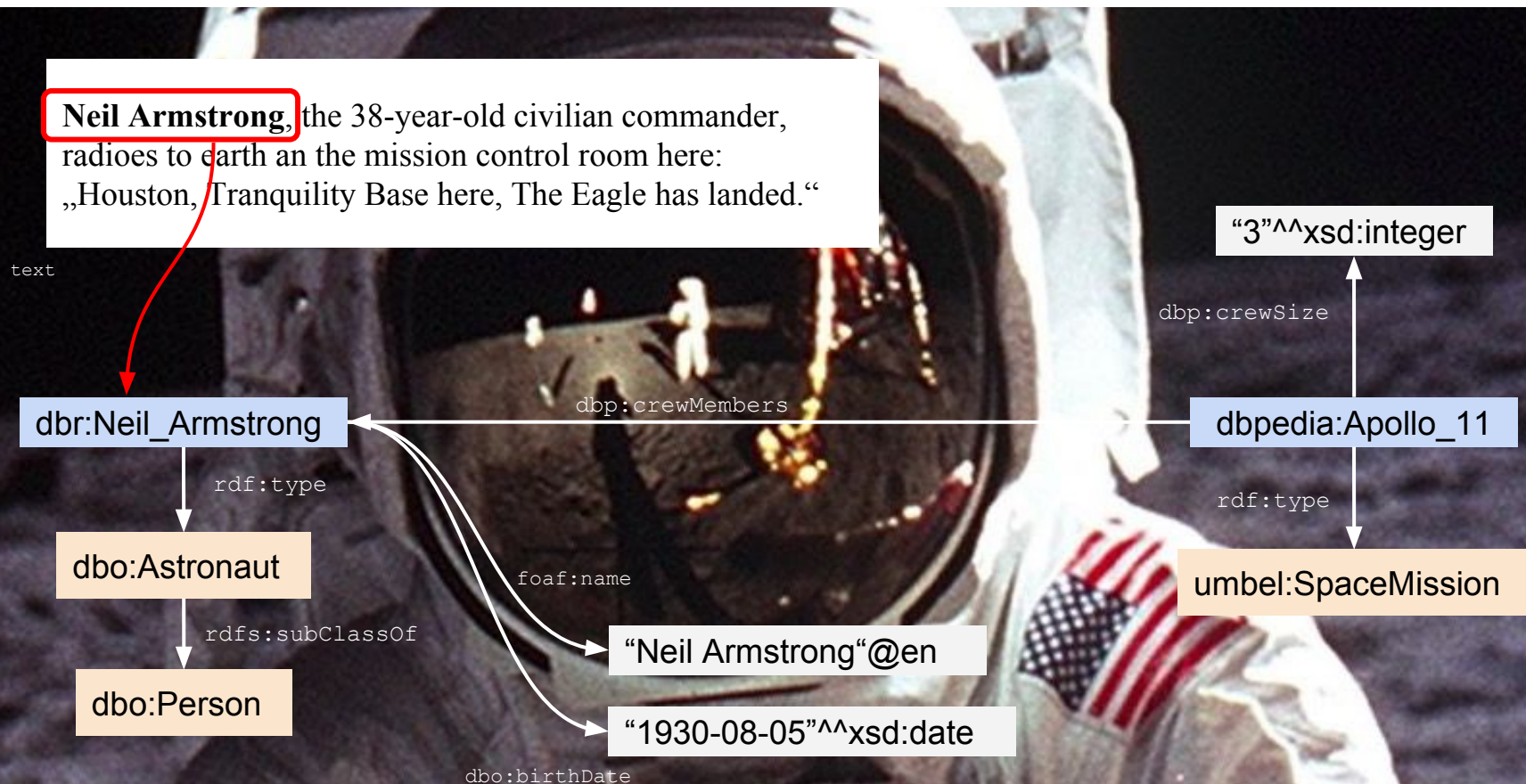
6.3 Named Entity Resolution

 **FIZ Karlsruhe**
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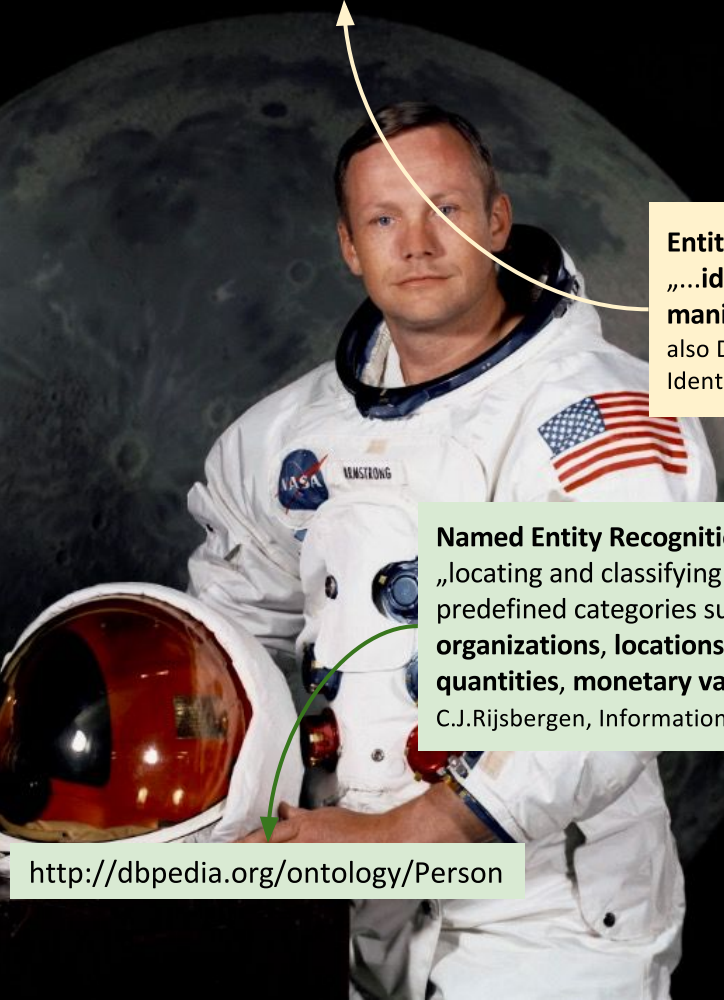
Leibniz Institute for Information Infrastructure
Karlsruhe Institute of Technology
Autumn 2016

Semantic Media Analysis

“Neil Armstrong” is more than just a character string



http://dbpedia.org/resource/Neil_Armstrong



Entity Resolution

„...**identifying and linking/grouping different manifestations of the same real world object**“

also Disambiguation, Record Linkage, Object Identification, etc

Named Entity Recognition

„locating and classifying atomic elements...into predefined categories such as **names, persons, organizations, locations, expressions of time, quantities, monetary values**, etc.“

C.J.Rijsbergen, Information Retrieval (1979)

<http://dbpedia.org/ontology/Person>

About: Neil Armstrong

An Entity of Type : **Man in Space Soonest**, from Named Graph : <http://dbpedia.org>, within Data Space : dbpedia.org

Neil Alden Armstrong (August 5, 1930 – August 25, 2012) was an American astronaut and the first person to walk on the Moon. He was also an aerospace engineer, naval aviator, test pilot, and university professor. Before becoming an astronaut, he served in the Korean War.

dbo:abstract

▪ Neil Alden Armstrong (August 5, 1930 – August 25, 2012) was an American astronaut and the first person to walk on the Moon. He was also an aerospace engineer, naval aviator, test pilot, and university professor. Before becoming an astronaut, he served in the U.S. Navy and served in the Korean War. After the war, he earned his bachelor's degree from the University of Southern California and worked as a test pilot at the National Advisory Committee for Aeronautics (NACA) High-Speed Flight Station. He later completed graduate studies at the University of Southern California. He was selected for the Gemini, Apollo, and Skylab space programs, and was the first man to walk on the Moon during the Apollo 11 mission. He later completed graduate studies at the University of Southern California. He was selected for the Gemini, Apollo, and Skylab space programs, and was the first man to walk on the Moon during the Apollo 11 mission. He later completed graduate studies at the University of Southern California. He was selected for the Gemini, Apollo, and Skylab space programs, and was the first man to walk on the Moon during the Apollo 11 mission.

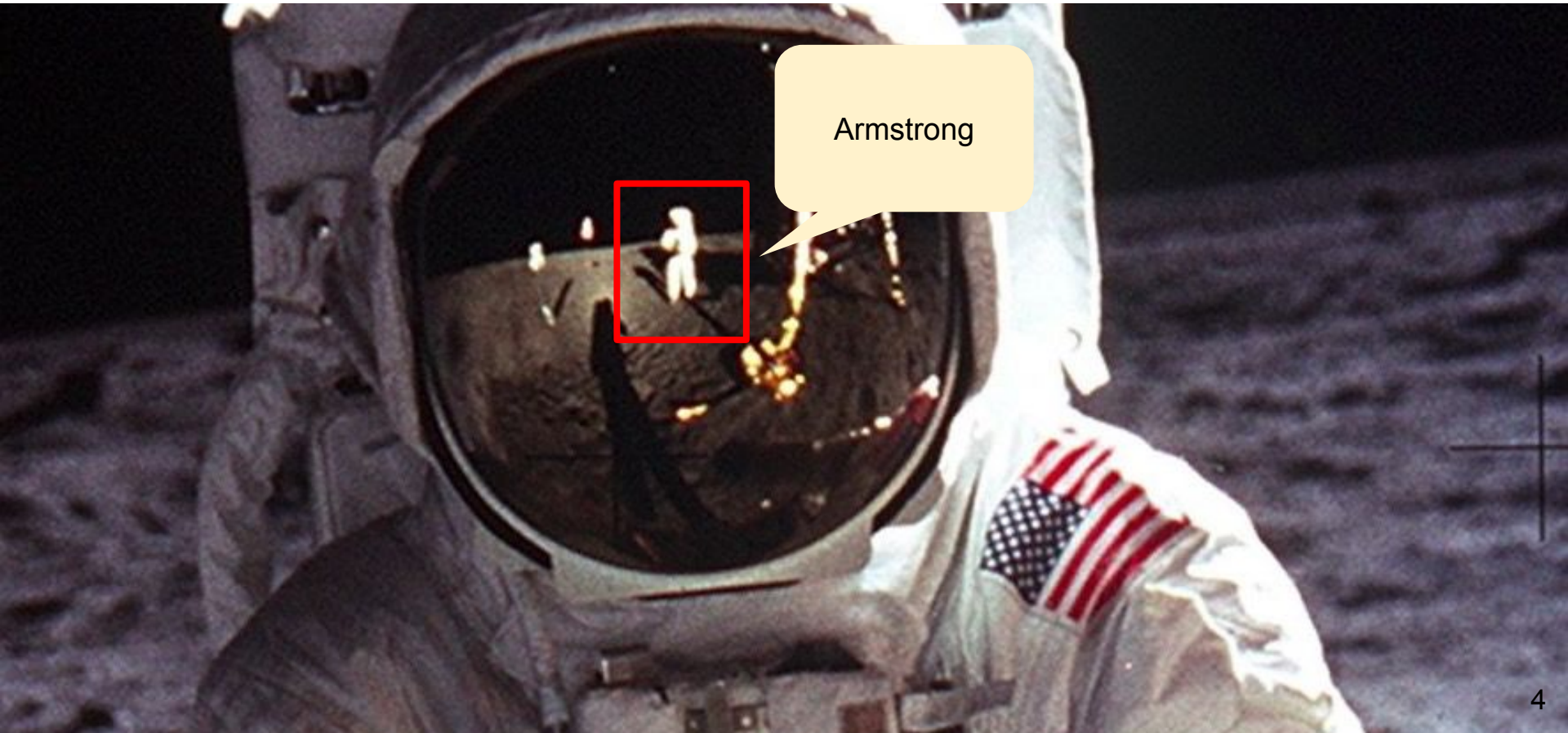
dbo:occupation

- dbr:Test_pilot
- dbr:Naval_aviation

dbo:selection

- dbr:NASA_Astronaut_Group_2
- dbr:List_of_astronauts_by_year_of_selection

But what, if there is no trivial unique identification?



Armstrong



Armstrong + Moon



Understanding requires Context!

Neil Armstrong
1930 - 2012

Disambiguation

Experience

Context

Context

symbolizes

Concept

refers to

Symbol

stands for

Object

"Armstrong"

Pragmatics



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Ogden, Richards: The **Meaning of Meaning**: A Study of the Influence of
Language upon Thought and of the Science of Symbolism, 1923

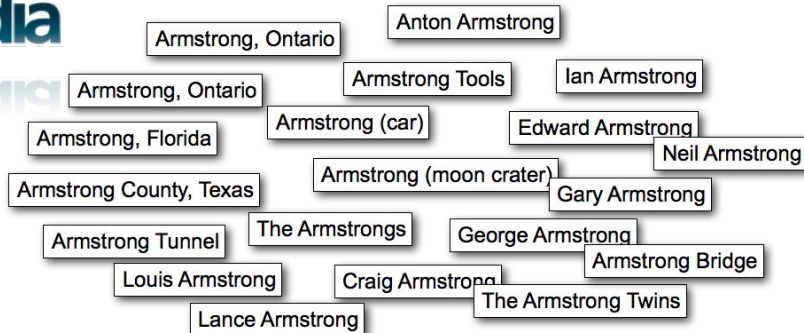
Named Entity Resolution - Simplified Example

Armstrong landed the Eagle on the Moon



Determine all possible Entity Candidates

- linguistic analysis (POS tagging)
- normalization
- encoding and spelling
- special (language dependent) characters
- language dependent spellings
- abbreviations, acronyms
- type dependent spellings
- alternative names and synonyms
- fuzzy string mapping
- ...

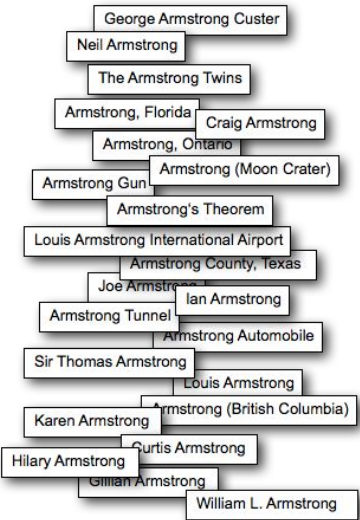


Named Entity Resolution - Simplified Example

Armstrong landed the Eagle on the Moon

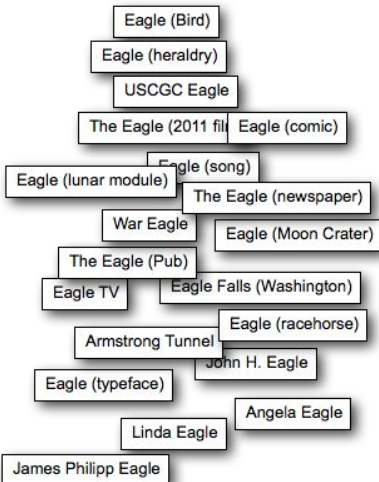
Armstrong

448 entities



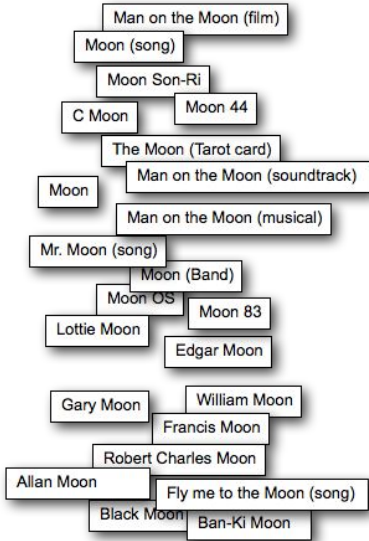
Eagle

95 entities



Moon

156 entities



Disambiguation Techniques

Select matching entities from all possible candidate entities:

- 
- Popularity based strategies
 - Linguistic strategies
 - Statistical strategies
 - Semantic based strategies
- reference text corpus (wikipedia)
 - link graph (wikipedia)
 - semantic graph (dbpedia)

General Approach

1. Make an assumption
2. Do the strategies support or contradict your assumption
3. Make decision according to logical and probabilistic rules/constraints



WIKIPEDIA
The Free Encyclopedia

Consider all entities within the same context

Armstrong landed the Eagle on the Moon

Louis Armstrong

From Wikipedia, the free encyclopedia

Louis Armstrong (August 4, 1901 – July 6, 1971), nicknamed **Satchmo** or **Pops**, was an American jazz trumpeter and singer from New Orleans, Louisiana.

Coming to prominence in the 1920s as an "inventive" trumpeter and cornet player, Armstrong was a foundational influence in jazz, shifting the focus of the music from collective improvisation to solo performance. With his instantly recognizable gravelly voice, Armstrong was also an influential singer, demonstrating great dexterity as an improviser, bending the lyrics and melody of a song for expressive purposes. He was also skilled at scat singing (singing by using sounds and syllables instead of actual lyrics).

Renowned for his charismatic stage presence and voice almost as much as for his trumpet playing, Armstrong's influence extends well beyond jazz music, and by the end of his career in the 1950s, he was widely regarded as a profound influence on popular music in general. Armstrong was one of the first truly popular African-American entertainers to "cross over", whose skin color was secondary to his music in an America that was severely racially divided. He rarely publicly politicized his race, often to the dismay of fellow African-Americans, but took a well-publicized stand for desegregation during the Little Rock Crisis. His safety and personality allowed him socially acceptable access to the upper echelons of American society that were highly restricted for a black man.

Contents (hide)

- Early life
- Career
 - The All Stars
- Death
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 - Personality
 - Nickname
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 - Religion
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Early life

Louis Armstrong

From Wikipedia, the free encyclopedia

Eagle

This article is about the bird. For other uses, see *Eagle* (disambiguation).

Eagle is a common name for some members of the bird family *Accipitridae*, and belong to several genera that are not necessarily closely related to each other. Most of the more than sixty species occur in Eurasia and Africa.^[1] Outside this area, just eleven species can be found - two species (the Bald Eagle and Golden Eagle) in the United States and Canada, nine species in Central America and South America, and three species in Australia.

Contents (hide)

- Description
- Species
- Eagles in culture
 - Religion
 - Eagle as national symbol
- References
- Further reading
- External links

Description

Eagles are large, powerfully built birds of prey, with a heavy head and beak. Even the smallest eagles, like the Booted Eagle (*Aquila pennata*) (which is some Common Buzzard (Buteo buteo) or Red-tailed Hawk (B. jamaicensis)), have relatively longer and more evenly broad wings, and more direct, faster flight - de aerodynamic features. Most eagles are larger than any other raptors apart from some vultures. The smallest species called eagle is the South Noddy (Serpot at 450 g (1 lb) and 40 cm (16 in)). The largest species are discussed below. Like all birds of prey, eagles have very large hooked beaks for tearing flesh from their kills, and powerful talons. The beak is typically heavier than most other birds of prey. Eagles' eyes are extremely powerful, having up to 3.6 times human acuity which enables them to spot potential prey from a very long distance.^[2] This keen eyesight is primarily contributed by their extremely large pupils which ensure (catching) of the incoming light. The female of all species of eagle known are larger than the male.^[3(5)]

Eagles normally build their nests, called eyries, in tall trees or on high cliffs. Many species lay two eggs, but the older, larger chick frequently kills its younger sibling. The dominant chick tends to be the female, as they are bigger than the male. The parents take no action to stop the killing.^[3(6)]

Due to the size and power of many eagle species, they are ranked at the top of the food chain as apex predators amongst the avian world. The type of prey varies by habitat and intraspecific eagles prefer to capture fish, though the species in the former often capture various animals, especially other water birds, a keystone predators of other birds. The snake and serpent eagles of the genera *Circus*, *Terapia* and *Sphobium* predominantly prey on the great diversity of tropics of Africa and Asia. The eagles of the genus *Aquila* are often the top birds of prey in open habitats, taking almost any medium-sized vertebrate they can catch as prey.^[7] The Bald Eagle is noted for having been with the heaviest tool verified to be carried by any flying bird, since one eagle flew with a 6.8 kg (15 lb) However, a few eagles may target prey considerably heavier than themselves; such prey is too heavy for fly with and thus it is either eaten at the site of the kill a parent or nest. Golden and Crowned Eagles have killed ungulates weighing up to 30 kg (66 lb) and a Martial Eagle even killed a 37 kg (82 lb) duiker, 7.4 ft (2.2 m) long.^[7(1)] Authors on birds: David Allen Stoley, Pete Dunne and Cluff Stoney, described the behavioral difference between hunting eagles and on this case the Bald and Golden Eagles as compared to other North American raptors.^[12]

They have at least one singular characteristic: it has been observed that most birds of prey look back over their shoulders before striking prey (or short predation is at all a two-sided contest). All hawks seem to have this habit, from the smallest kestrel to the largest Ferruginous - but not the Eagles.

Among the eagles are some of the largest birds of prey, only the osprey and some of the Old World vultures are markedly larger. It is usually debated whether

Fly Me to the Moon

From Wikipedia, the free encyclopedia

For other uses, see *Fly Me to the Moon* (disambiguation).

This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsubstantiated material may be challenged and removed. (February 2012)

"Fly Me to the Moon" is a popular standard song written by Bart Howard in 1954. It was originally titled "In Other Words", and was introduced by Felicia Sanders in cabarets. The song became known popularly as "Fly Me to the Moon" from the first line of the B verse, and after a few years the publishers changed the title to that officially.^[*citation needed*]

Contents (hide)

- History of notable recordings
- Association with space travel
- Appearance in film, television and other media
- References
- External links

History of notable recordings

- Kaye Ballard recorded this song first. Her recording was released by Decca Records in 1954 on a 45 rpm record (catalog number 29114). Billboard (magazine) said that it was "A love song sung with feeling..." in a brief review published on 8 May 1954. The record included one other song "Lazy Afternoon" which Kaye Ballard was then singing in the stage musical The Golden Apple.
- Chris Connor recorded it in April 1955 for Bethlehem Records who released it on EP (catalog number BCP-127) in 1955 and on the LP "Chris" (catalog number BCP-56) in 1957.
- Portia Nelson recorded it for her album Let Me Fly You (1956)
- Johnny Mathis also recorded it in 1956, which was the first time the title "Fly Me to the Moon" appeared on a record label.
- Eydie Gorme recorded the song in 1958 for her Grammy nominated album "Eydie in Love" (released by ABC Paramount in September 1958 catalogue number ABC/AMCS 246).
- Felicia Sanders recorded the song in 1959. (Released by Decca Records, catalogue number 30937.)
- April Stevens recorded the song in 1960 on her album Teach Me Tiger. (Imperial 12055).
- Nancy Heyson featured the song on her 1960 album Like in Love (Capitol SK 1319).
- Hoppy Lee recorded the song for her 1960 album Philly Eyes released by Capitol Records in 1960.
- Peter Nero included a piano version of the song on his album "Piano Flauto" released in April 1961 (RCA Victor LPM2334).
- Nat King Cole recorded the song for the album Nat King Cole Sings George Shearing Plays (1961). (Released on Capitol Records, catalog #1675)
- Sarah Vaughan recorded the song for her 1962 album You're Mine You. This album was orchestrated and conducted by Quincy Jones.
- Mel Tormé recorded the song in 1962 as live performance released by Atlantic on the album Mel Tormé at the Red Hot.
- Phelia Clark recorded the song on her 1962 album In Other Words.
- Joe Harrell recorded an instrumental version in 1962, as "Fly Me to the Moon - Bossa Nova". This version became the biggest chart hit, reaching #14 (#4 easy listening) on the U.S. pop singles charts.
- Jazz drummer Roy Haynes, accompanied by Rubean Roland Kirk, Tommy Flanagan on piano, and Henry Grimes on double bass recorded the song as a brisk instrumental waltz for the album Out of the Afternoon (1962). (Released by Impulse! Records, AS-33).
- Dinah Washington recorded it for her album I Love (1962)
- Joni James included it on her self-titled I Feel a Song Coming On (1962)
- Jack Jones recorded the song for his 1962 album Gift of Love (Kapp Records KS 3292).
- Count Basie included an instrumental version of the song, arranged by Quincy Jones, on his album "This Time by Basie - Hits Of The 50's & 60's" released in January 1963 (Reprise Records catalogue number R-6075).
- Brenda Lee performed this song on her album All Alone Am I released in February 1963.
- Connie Francis recorded it in Italian as Portami con te (MGM K 2078) released in April 1963. She also recorded a Spanish version Llévame a la luna (MGM HT 057-78) released in 1963 also.

Named Entity Resolution - Simplified Example



WIKIPEDIA
The Free Encyclopedia

Armstrong landed the Eagle on the Moon

Consider all entities within the same context

Neil Armstrong
From Wikipedia, the free encyclopedia
(redirected from Neil armstrong)

For other people named Neil Armstrong, see Neil Armstrong (disambiguation).

Neil Alden Armstrong (August 5, 1930 – August 25, 2012) was an American astronaut and the first person to walk on the Moon. He was also an aerospace engineer, naval aviator, test pilot, and university professor. Before becoming an astronaut, Armstrong was an officer in the U.S. Navy and served in the Korean War. After the war, he earned his bachelor's degree at Purdue University and served as a test pilot at the National Advisory Committee for Aeronautics High-Speed Flight Station, now known as the Dryden Flight Research Center, where he logged over 900 flights. He later completed graduate studies at the University of Southern California.

A participant in the U.S. Air Force's Man in Space Soonest and X-100 Dyna-Soar human spaceflight programs, Armstrong joined the NASA Astronaut Corps in 1962. He made his first space flight, as command pilot of Gemini 8, in 1966, becoming NASA's first civilian astronaut to fly in space. On this mission, he performed the first docking of two spacecraft, with pilot David Scott.^[1]

Armstrong's second and last spaceflight was as mission commander of the Apollo 11 moon landing, in July 1969. On this mission, Armstrong and Buzz Aldrin descended to the lunar surface and spent two and a half hours exploring, while Michael Collins remained in lunar orbit in the Command Module. Along with Collins and Aldrin, Armstrong was awarded the Presidential Medal of Freedom by President Richard Nixon; in 1976, President Jimmy Carter presented Armstrong the Congressional Space Medal of Honor in 1976; he and his former crewmates received the Congressional Gold Medal in 2009.

Armstrong died in Cincinnati, Ohio, on August 25, 2012, at the age of 82, after complications from coronary artery bypass surgery.^{[2][3]}

Contents [hide]

- 1 Early years
- 2 Navy service
- 3 College years
- 4 Test pilot
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 - 5.1.1 Gemini 8
 - 5.1.2 Gemini 11
 - 5.2 Apollo program
 - 5.2.1 Apollo 11
 - 5.2.1.1 Voyage to the Moon
 - 5.2.1.2 First Moon walk
 - 5.2.1.3 Return to Earth
- 6 Life after Apollo
 - 6.1 Teaching
 - 6.2 NASA accident investigations
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 - 6.4 Voice actor
- 7 Personal life
 - 8 Illness and death
 - 9 Legacy
 - 10 See also
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Early years

Neil Armstrong was born on August 5, 1930, in Wapakoneta, Ohio, to Stephen Koenig Armstrong and Viola Louise Engel.^{[3][4]} He was of Scottish, Irish, and German ancestry and had two younger siblings, June and Dean. Stephen Armstrong worked as an auditor^[3] for the Ohio

Apollo Lunar Module
From Wikipedia, the free encyclopedia

The **Apollo Lunar Module** (LM), previously known as the **Lunar Excursion Module** (LEM), was the lander portion of the Apollo spacecraft built for the US Apollo program by Grumman to carry a crew of two from lunar orbit to the surface and back. Six such craft successfully landed on the Moon between 1969 and 1972.

The LM, consisting of an ascent stage and descent stage, was ferried to lunar orbit by its companion Command/Service Module (CSM), a separate spacecraft of approximately twice its mass, which also took the astronauts home to Earth. After completing its mission, the LM was discarded. In one sense it was the world's first true spacecraft in that it was capable of operation only in outer space, structurally and aerodynamically incapable of flying through the Earth's atmosphere.

Its development was also plagued with several hurdles which delayed its first unmanned flight by about ten months, and its first manned flight by about three months. Despite this, the LM eventually became the most reliable component of the Apollo/Saturn system, the only one never to suffer any failure that significantly impacted a mission,^[1] and in at least one instance (Apollo 13 LM-7 Aquarius) greatly exceeded its design requirements by maintaining life support for astronauts after an explosion damaged the Apollo Service Module.

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- 2 History
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 - 2.2 Astronaut training
 - 2.3 Development flights
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 - 2.5 Extended / J Class Missions
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 - 5 Proposed derivatives
 - 5.1 Apollo Telescope Mount
 - 5.2 LM from (aka Lunar Payload Module)
 - 6 Depiction in fiction
 - 6.1 Media
 - 6.2 See also
 - 6.3 References
 - 6.4 Further reading
 - 6.5 External links

Operational profile

At launch, the Lunar Module sat directly beneath the Command/Service Module (CSM) with legs folded, inside the Spacecraft-to-LM Adapter (SLA) attached to the S-IVB first stage of the Saturn V rocket. There it remained through earth parking orbit and the Trans Lunar Injection (TLI) rocket burn to send the craft toward the Moon.

Soon after TLI, the SLA opened and the CSM separated, turned around, came back to dock with the Lunar Module, and extracted it from the S-IVB. During the flight, the docking hatches were opened and the LM Pilot entered the LM to temporarily power up and test its systems (except for propulsion). Throughout the flight, he performed the role of an engineering officer, responsible for monitoring the systems of both spacecraft.

After achieving a lunar parking orbit, the Commander and LM Pilot entered and powered up the LM, replaced the hatches and docking equipment, unbraked and locked its landing legs, and separated from the CSM, flying independently. The Commander operated the flight controls and engine throttle, while the Lunar Module Pilot operated other spacecraft systems and kept the Commander informed on systems status and navigational information. After inspection of the landing gear by the Command Module Pilot, the LM was withdrawn to a safe distance, then the descent engine was coasted toward into the direction of travel to perform the

Moon
From Wikipedia, the free encyclopedia

This article is about Earth's Moon. For moons in general, see *Natural satellite*. For other uses, see *Moon* (disambiguation).

The **Moon** is the only natural satellite of the Earth,^{[1][2]} and the fifth largest satellite in the Solar System. It is the largest natural satellite of a planet in the Solar System relative to the size of its primary,^[3] having 27% the diameter and 60% the density of Earth, resulting in $\frac{1}{50}$ its mass. The Moon is the second densest satellite after Io, a satellite of Jupiter.

The Moon is in synchronous rotation with Earth, always showing the same face with its near side marked by dark volcanic maria that fill the largest ancient impact basins and the prominent impact craters. It is the brightest object in the sky after the Sun, although its surface is actually very dark, with a reflectance similar to that of coal. Its prominence in the sky and its regular cycle of phases have, since ancient times, made the Moon an important cultural influence on languages, calendars, art and mythology. The Moon's gravitational influence produces the ocean tides and the minute lengthening of the day. The Moon's current orbital distance, about forty times the diameter of the Earth, causes it to appear almost the same size in the sky as the Sun, allowing it to cover the Sun nearly precisely in total solar eclipses. This matching of apparent visual size is a coincidence. The Moon's linear distance from the Earth is currently increasing at a rate of 3.82±0.07 cm per year, however this rate is not constant.^[4]

The Moon is thought to have formed nearly 4.5 billion years ago, not long after the Earth. Although there have been several hypotheses for its origin in the past, the current most widely accepted explanation is that the Moon formed from the debris left over after a giant impact between Earth and a Mars-sized body. The Moon is the only celestial body other than Earth on which humans have set foot. The Soviet Union's Luna programme was the first to reach the Moon with unmanned spacecraft in 1959. The United States' NASA Apollo program achieved the only manned missions to date, beginning with the first manned lunar orbiting mission by Apollo 8 in 1968, and six manned lunar landings between 1969 and 1972, with the first being Apollo 11. These missions returned over 380 kg of lunar rocks, which have been used to develop a geological understanding of the Moon's origins, the formation of its internal structure, and its subsequent history.

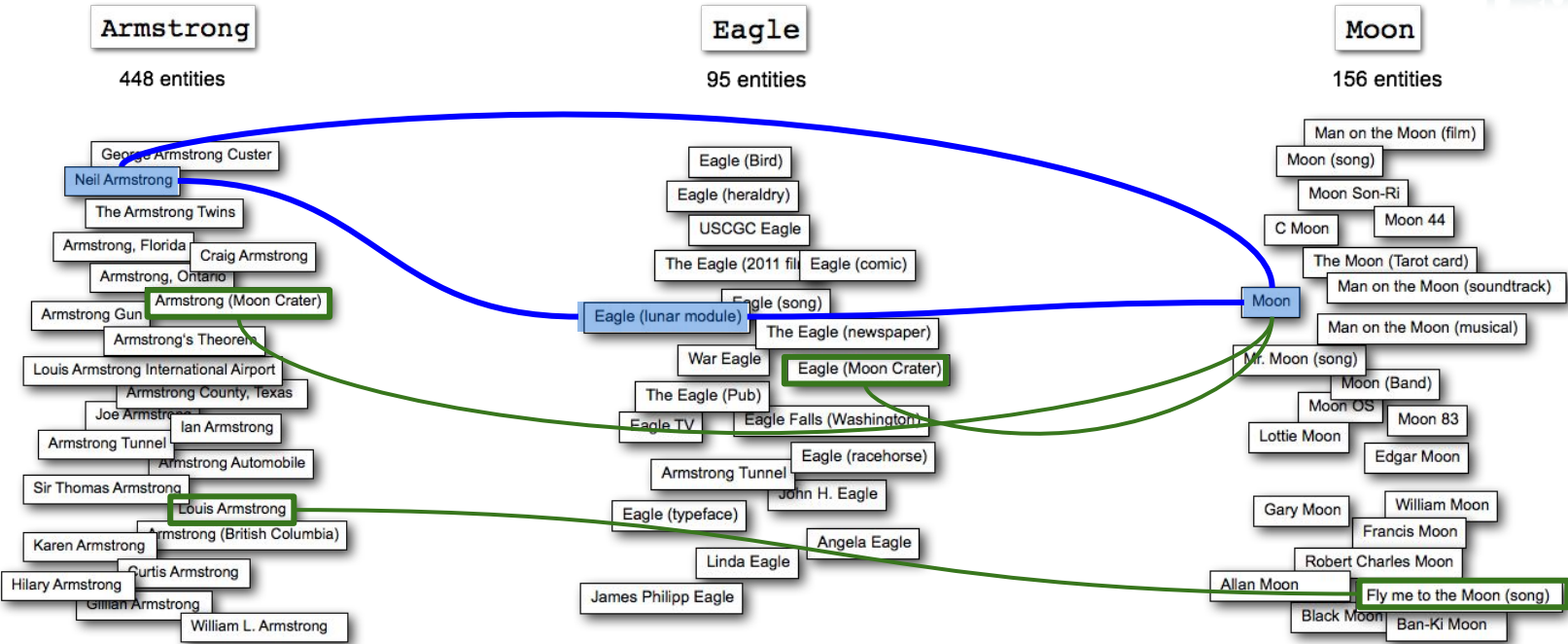
After the Apollo 17 mission in 1972, the Moon has been visited only by unmanned spacecraft, notably by the final Soviet Lunokhod rover. Since 2004, Japan's Okiwa, India, the United States, and the European Space Agency have each sent lunar orbiters. These spacecraft have contributed to confirming the discovery of lunar water ice in permanently shadowed craters at the poles and bound into the lunar regolith. Future manned missions to the Moon have been planned, including government as well as privately funded efforts. The Moon remains, under the Outer Space Treaty, free to all nations to explore for peaceful purposes.

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 - 3.2 Surface geology
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 - 3.2.2 Impact craters
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 - 5.2 First direct exploration: 1959–1976
 - 5.3 Soviet missions
 - 5.4 United States exploration

Named Entity Resolution - Simplified Example

Armstrong landed the Eagle on the Moon





Next: 04 More Named Entity Resolution

OpenHPI - Course Linked Data Engineering - Lecture 6: Advanced Linked Data Based Applications