ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ

Σχολή Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών

Εργαστήριο Διοίκησης Πληροφοριακών Συστημάτων

ΔΙΟΙΚΗΣΗ ΨΗΦΙΑΚΗΣ ΕΠΙΧΕΙΡΗΣΗΣ

8ο ΕΞΑΜΗΝΟ

ΔΙΔΑΣΚΟΝΤΕΣ:

ΚΑΘΗΓΗΤΗΣ ΓΡ. ΜΕΝΤΖΑΣ

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ΕΡΓΑΣΙΑ 4 ΑΝΑΖΗΤΗΣΗ ΚΑΙ RECOMMENDER SYSTEMS

1. ΑΝΑΖΗΤΗΣΗ – TFIDF

Υποθέστε ότι πραγματοποιείτε μια αναζήτηση σε μια μηχανή αναζήτησης με τους όρους "Sci-Fi, space, astro". Θεωρείστε σαν μοναδικά δεδομένα της μηχανής τις παρακάτω περιγραφές ταινιών.

α. Χρησιμοποιείστε τη μετρική TF-IDF (χωρίς TF normalization)   για να βρείτε ποια θα είναι η κατάταξη των αποτελεσμάτων. Να χρησιμοποιηθεί Cosine Similarity και να ληφθούν υπόψη το κείμενο των τίτλων και οι παράγωγες/σύνθετες λέξεις (Stemming). Σχολιάστε τα αποτελέσματα.

1. 2001: A Space Odyssey (1968)

G | 2h 29min | Adventure, Sci-Fi

At the "Dawn of Man," a group of hominids encounters a mysterious black monolith alien to their surroundings. To the strains of Strauss's 1896 Also sprach Zarathustra, a hominid invents the first weapon, using a bone to kill prey. As the hominid tosses the bone in the air, Kubrick cuts to a 21st century spacecraft hovering over the Earth, skipping ahead millions of years in technological development. U.S. scientist Dr. Heywood Floyd (William Sylvester) travels to the moon to check out the discovery of a strange object on the moon's surface: a black monolith. As the sun's rays strike the stone, however, it emits a piercing, deafening sound that fills the investigators' headphones and stops them in their path. Cutting ahead 18 months, impassive astronauts David Bowman (Keir Dullea) and Frank Poole (Gary Lockwood) head toward Jupiter on the spaceship Discovery, their only company three hibernating astronauts and the vocal, man-made HAL 9000 computer running the entire ship. When the all-too-human HAL malfunctions, however, he tries to murder the astronauts to cover his error, forcing Bowman to defend himself the only way he can.

2. Solaris (2002)

PG-13 | 1h 39min | Drama, Mystery, Romance

A therapist travels to a distant space station to treat a group of cosmonauts traumatized by mysterious entities -- and ends up having to deal with an entity of his own -- in this second film version of Stanislaw Lem's philosophical novel. Solaris stars George Clooney as Chris Kelvin, a psychologist still mourning the loss of his wife Rheya (Natascha McElhone) when he's implored by a colleague named Gibarian (Ulrich Tukur) to investigate the increasingly weird goings-on at the Prometheus space station.

3. Gravity (2013)

PG-13 | 1h 31min | Drama, Sci-Fi, Thriller

Gravity stars Sandra Bullock and George Clooney in a heart-pounding. Bullock plays Dr. Ryan Stone, a brilliant medical engineer on her first shuttle mission, with veteran astronaut Matt Kowalsky (Clooney). But on a seemingly routine spacewalk, disaster strikes. The shuttle is destroyed, leaving Stone and Kowalsky completely alone - tethered to nothing but each other and spiraling out into the blackness. The deafening silence tells them they have lost any link to Earth and any chance for rescue. As fear turns to panic, every gulp of air eats away at what little oxygen is left. But the only way home may be to go further out into the terrifying expanse of space.

4. Moon (2009)

R | 1h 37min | Drama, Mystery, Sci-Fi

An astronaut miner extracting the precious moon gas that promises to reverse the Earth's energy crisis nears the end of his three-year contract, and makes an ominous discovery in this psychological sci-fi film starring Sam Rockwell and Kevin Spacey. For three long years,

Sam Bell has dutifully harvested Helium 3 for Lunar, a company that claims it holds the key to solving humankind's energy crisis. As Sam's contract comes to an end, the lonely astronaut looks forward to returning to his wife and daughter down on Earth, where he will retire early and attempt to make up for lost time. His work on the Selene moon base has been enlightening -- the solitude helping him to reflect on the past and overcome some serious anger issues -- but the isolation is starting to make Sam uneasy. With only two weeks to go before he begins his journey back to our planet, Sam starts feeling strange: he's having inexplicable visions, and hearing impossible sounds.
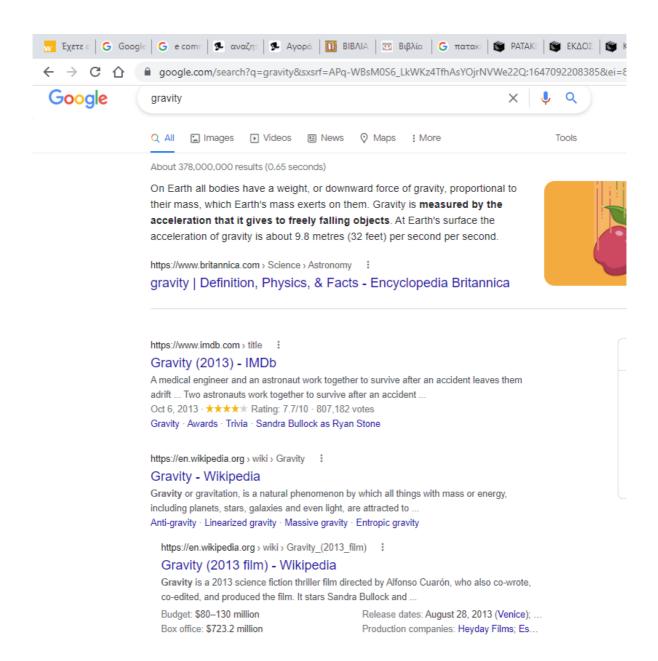
5. Interstellar (2014)

PG-13 | 2h 49min | Adventure, Drama, Sci-Fi

In the near future around the American Midwest, Cooper an ex-science engineer and pilot, is tied to his farming land with his daughter Murph and son Tom. As devastating sandstorms ravage earths crops, the people of Earth realize their life here is coming to an end as food begins to run out. Eventually stumbling upon a NASA base near Cooper's home, he is asked to go on a daring mission with a few other scientists into a wormhole because of Cooper's scientific intellect and ability to pilot aircraft unlike the other crew members. In order to find a new home while Earth decays, Cooper must decide to either stay, or risk never seeing his children again in order to save the human race by finding another habitable planet.

2. ΑΝΑΖΗΤΗΣΗ – PRECISION/RECALL

Ενώ ψάχνετε στοιχεία σχετικά με την ταινία «Gravity», η μηχανή αναζήτησης "Google" σας επιστρέφει τα παρακάτω αποτελέσματα.

https://spaceplace.nasa.gov › what-is-gravity ⋮

What Is Gravity? | NASA Space Place – NASA Science for Kids

Gravity is the force by which a planet or other body draws objects toward its center. The force of gravity keeps all of the planets in orbit around the sun.

https://www.warnerbros.com › movies › gravity ⋮

Gravity | Movies - WarnerBros.com

Academy Award® winners Sandra Bullock (The Blind Side) and George Clooney (Up in the Air, Syriana) star in this heart-pounding thriller written,

https://www.gravityforms.com ⋮

Gravity Forms | The Best WordPress Form Plugin | Form Builder

Create custom forms on WordPress with Gravity Forms, the easiest-to-use, secure, and reliable WordPress form builder plugin for your website.

https://www.merriam-webster.com › dictionary › gravity ⋮

Gravity Definition & Meaning - Merriam-Webster

The meaning of GRAVITY is dignity or sobriety of bearing. How to use gravity in a sentence.

https://www.skroutz.gr › Baseus-Βάσ... ▾ Translate this page

Baseus Βάση Κινητού Αυτοκινήτου Osculum Type Gravity με ...

Δες τιμή, χαρακτηριστικά & πραγματικές κριτικές χρηστών για το προϊόν Baseus Βάση Κινητού Αυτοκινήτου Osculum Type Gravity με Ρυθμιζόμενα Άγκιστρα SUYL-XP0S ...

★★★★☆ Rating: 3.7 · 79 reviews · Starting from €6.40 · In stock

https://gravitymobility.com ▾

Gravity Electric Vehicles NYC

Experience the next generation of urban sustainable mobility and electric vehicle infrastructure. Book a luxury ride with us today.

https://www.dictionary.com › browse › gravity ▾

Gravity Definition & Meaning | Dictionary.com

Gravity definition, the force of attraction by which terrestrial bodies tend to fall toward the center of the earth. See more.

https://www.0-gravity.ae ▾

Zero Gravity Dubai: The Best pool and beach bar night club in ...

Zero Gravity is the best pool and beach bar night club in Dubai. We are offering the Best Ladies night and DJs party in Dubai, UAE.

https://www.gravityrenewables.com ▾

Home - Gravity Renewables, Inc.

Advancing Small Hydroelectric Projects. Gravity Renewables is an owner, operator, and developer of small hydroelectric power plants in the United States.

https://dictionary.cambridge.org › dictionary › gravity ▾

GRAVITY | meaning in the Cambridge English Dictionary

3 days ago — gravity definition: 1. the force that attracts objects towards one another, especially the force that makes things fall.... Learn more.

https://gravityvault.com ▾

The Gravity Vault | Indoor Rock Climbing Gyms | NJ, NY & PA

The best indoor rock climbing gyms! Located in Chatham, Flemington, Hoboken, Middletown, Upper Saddle River, & Voorhees NJ | Melville & Poughkeepsie, ...

https://www.gravitysketch.com   ⋮

Gravity Sketch | 3D design and modelling software

Gravity Sketch is an intuitive 3D design platform for cross-disciplinary teams to create, collaborate, and review in an entirely new way.

https://www.gravity-uk.com   ⋮

Gravity: Welcome

Welcome to Gravity, The number one trampoline park in the UK. Gravity Trampoline Parks provide fun for the whole family with a range of activities for you ...

https://www.camirafabrics.com › ... › Contract Fabrics   ⋮

Gravity - Contract Upholstery Fabric Supplier | Camira

We design, manufacture and supply fabrics for commercial interiors; offices, schools, universities, bars, restaurants, hotels & healthcare.

https://www.gravitymedia.com   ⋮

Gravity Media | Global Leader in Broadcast Solutions

Gravity Media is a global leader in broadcast solutions formed by established broadcast and production facilities: Gearhouse Broadcast, ...

https://www.framestore.com › work › gravity   ⋮

Gravity | Framestore

Gravity. Warner Bros. Pictures. Alfonso Cuarón's remarkable blockbuster Gravity enjoyed fantastic critical success, collecting enough stars from film reviewers ...

https://www.washingtonpost.com › wonk › 2013/10/21   ⋮

Here's what 'Gravity' gets right and wrong about space - The ...

Oct 21, 2013 — Kevin Grazier, the science adviser for Alfonso Cuaron's new film "Gravity," has a bone to pick with Twitter-famous astrophysicist Neil ...

https://science.howstuffworks.com › ... › Geophysics   ⋮

How does gravity work? - Science | HowStuffWorks

Gravity is the force that causes two particles to pull towards each other. Learn about gravity and find out how Newton and Einstein explain gravity.

www.warnerbros.com › movies › gravity ▼

Gravity | Movies - WarnerBros.com

Academy Award® winners Sandra Bullock (The Blind Side) and George Clooney (Up in the Air, Syriana) star in this heart-pounding thriller written, directed and ...

www.imdb.com › title ▼

Gravity (2013) - IMDb

★★★★☆ Rating: 7.7/10 - 738,784 votes

Two astronauts work together to survive after an accident leaves them stranded in space. ... Ryan Stone (Sandra Bullock) is a brilliant medical engineer on her first shuttle mission, with veteran astronaut Matt Kowalski (George Clooney) in command of his last flight before retiring.

www.livescience.com › 37115-what-is-gravity ▼

What Is Gravity? | Live Science

Jun 3, 2013 - **Gravity** is the force that attracts two bodies toward each other, the force that causes apples to fall toward the ground and the planets to orbit the ...

www.space.com › classical-gravity ▼

What Is Gravity? | Space

Aug 21, 2019 - Einstein suggested that the shape of spacetime is what gives rise to the force we experience as **gravity**. A concentration of mass (or energy), such ...

www.britannica.com › science › gravity-physics ▼

gravity | Definition, Physics, & Facts | Britannica

Gravity, also called gravitation, in mechanics, the universal force of attraction acting between all matter. It is by far the weakest known force in nature and thus ...

www.rottentomatoes.com › gravity_2013 ▼

Gravity (2013) - Rotten Tomatoes

★★★★★ Rating: 96% - 347 reviews

Feb 25, 2014 - **Gravity** focuses on two astronauts, played by Sandra Bullock and George Clooney, as their Space Shuttle mission is torn apart (literally) by an ...

Rating: PG-13 (for intense perilous sequences, ...   **Genre**: Drama, Science Fiction & Fantasy

α. Ποια αποτελέσματα αναφέρονται στην ταινία και ποια όχι; Εξηγήστε με συντομία. Ποια από τα αποτελέσματα είναι σωστά(true positive) και ποια λάθος (false positive);

β. Αν γνωρίζουμε ότι υπάρχουν ακόμη 450 αποτελέσματα που σχετίζονται με την ταινία και δεν βρέθηκαν – false negative – υπολογίστε τα παρακάτω
   i. Precision
   ii. Recall
   iii. F-Measure

Σχολιάστε τα αποτελέσματα.

3. RECOMMENDER SYSTEMS

Έξι άνθρωποι αξιολόγησαν τις ταινίες του ερωτήματος 1 με βαθμολογία από 1 (καθόλου καλή) έως 10 (εξαιρετική) και τα αποτελέσματα φαίνονται στον παρακάτω πίνακα. **Αντικαταστήστε όπου Χ τον τελευταίο ψηφίο του Αριθμού Μητρώου σας, αφού προσθέσετε τον αριθμό 1.**

	2001	Solaris	Gravity	Moon	Interstellar
Χρήστης 1	**X**	4		6	7
Χρήστης 2	3	2		5	4
Χρήστης 3	5	1	4	3	**X**
Χρήστης 4	7	6	7	9	6
Χρήστης 5		2	**X**	3	4
Χρήστης 6	9	7	8	7	10

a. Υπολογίστε την ομοιότητα (similarity) μεταξύ των 6 χρηστών χρησιμοποιώντας δυο μεθόδους: Ευκλείδεια απόσταση και Pearson Correlation.

b. Χρησιμοποιώντας K-Nearest Neighbors με k=2 και weighted average και με τις δύο μετρικές του ερωτήματος a. υπολογίστε πως περιμένουμε να αξιολογήσει την ταινία **Gravity** ο χρήστης 2. Σχολιάστε τα αποτελέσματα.

c. Αν υποθέσουμε ότι χρησιμοποιούμε τις προτιμήσεις των χρηστών στις ταινίες για να προτείνουμε φίλους, τότε ποιες σχέσεις σας φαίνονται πιο πιθανές; Εξηγήστε.