

# Math Topics

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**Project 4 - NLP and Unsupervised Learning**  
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# Main Idea

If I want to learn about a concept...

...what classes should I take?

...what subjects are related?

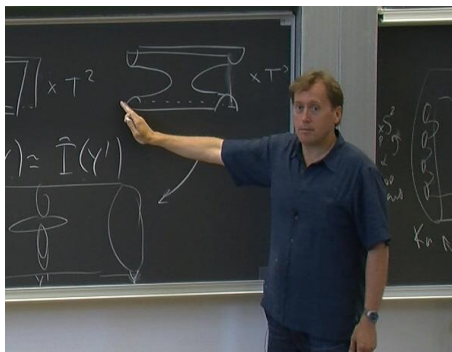
...what keywords will I need to know?

# Methods

Data

kaggle

You Tube



# Data

Linear Algebra

Probability

Computer  
Science

Differential  
Equations

Algorithms

Statistics

Calculus

Data Structures

Artificial  
Intelligence

Math for  
Engineers

Natural Language Processing

# Pipeline

Standardize

1. Pre-processing
2. Custom  
bi-grams
3. Lemmatization

Vectorize

Tf-Idf

Reduce Dimensions

Non-Negative  
Matrix  
Factorization

# Results

# Topics

Topic 0: lambda, eigenvalue, matrix, eigenvector, transpose, inverse, zero, diagonal, symmetric, orthogonal

Topic 1: probability, event, outcome, conditional, toss, occur, coin, sample, axiom, head

Topic 2: list, log, element, string, hash, code, algorithm, loop, array, sort

Topic 3: integral, theta, delta, curve, dx, area, formula, field, pi, region

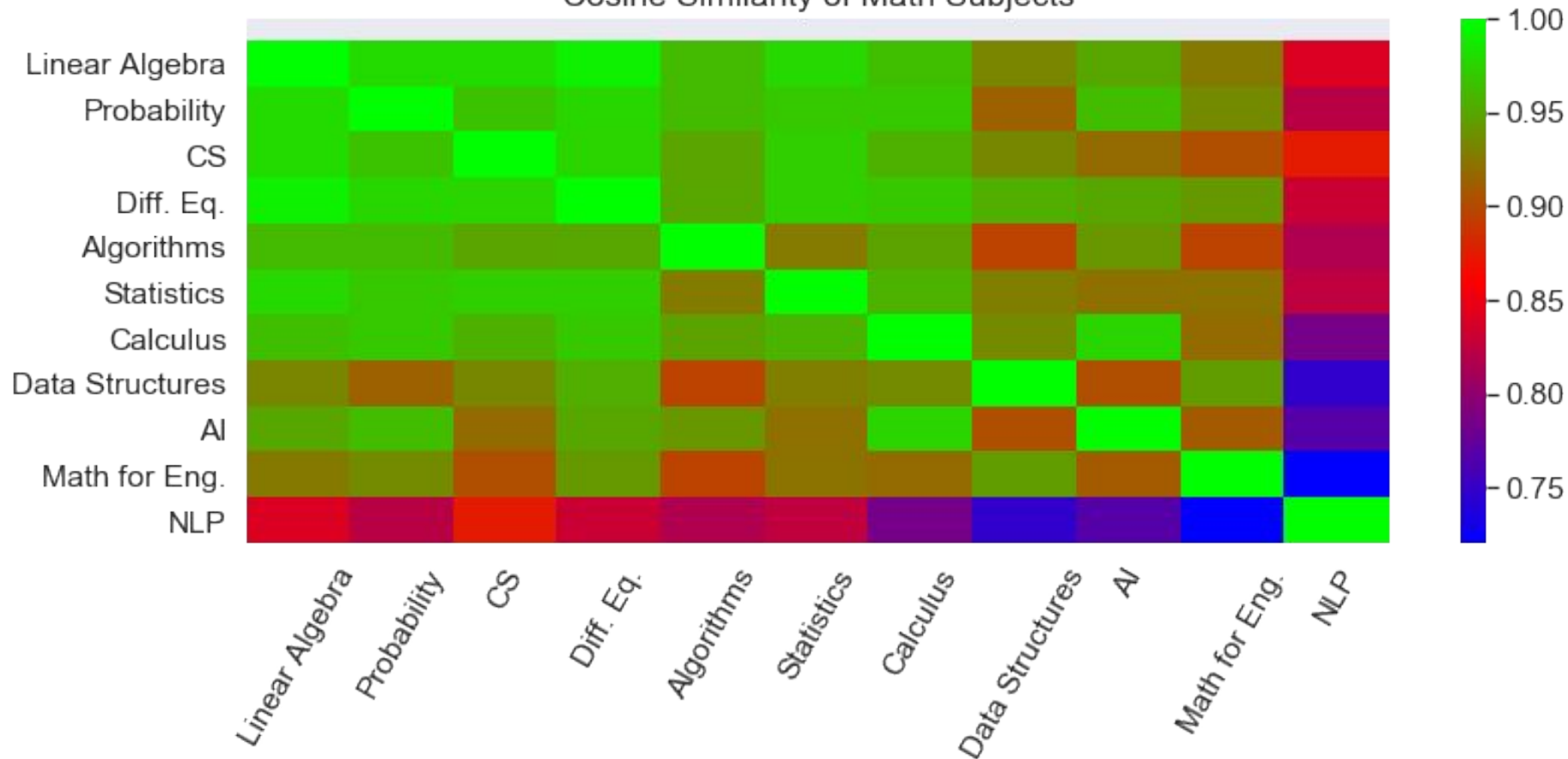
Topic 4: vector, transform, dot, plane, length, product, scalar, member, direction, component

...

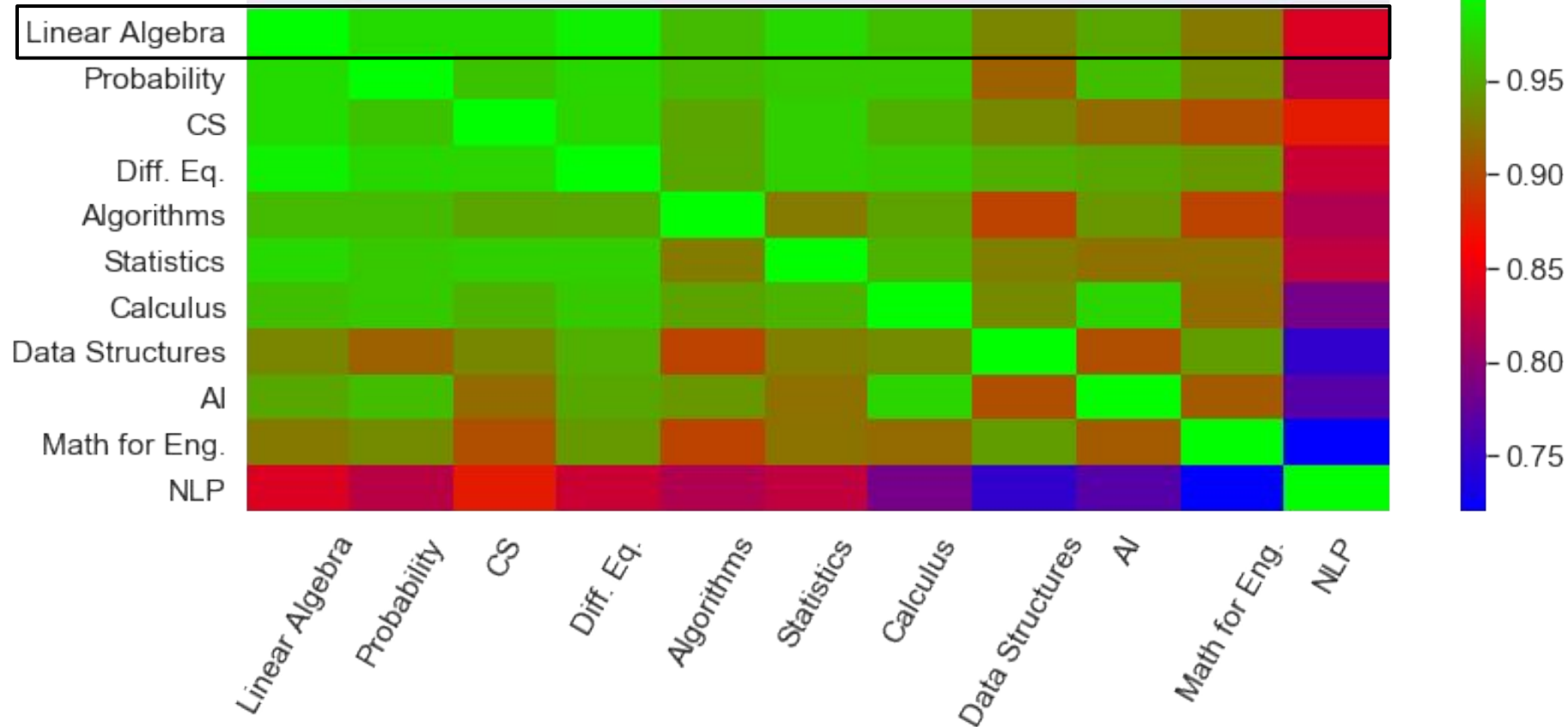
Topic 14: model, neural, word, datum, error, network, hypothesis, learning, input, sort



# Cosine Similarity of Math Subjects

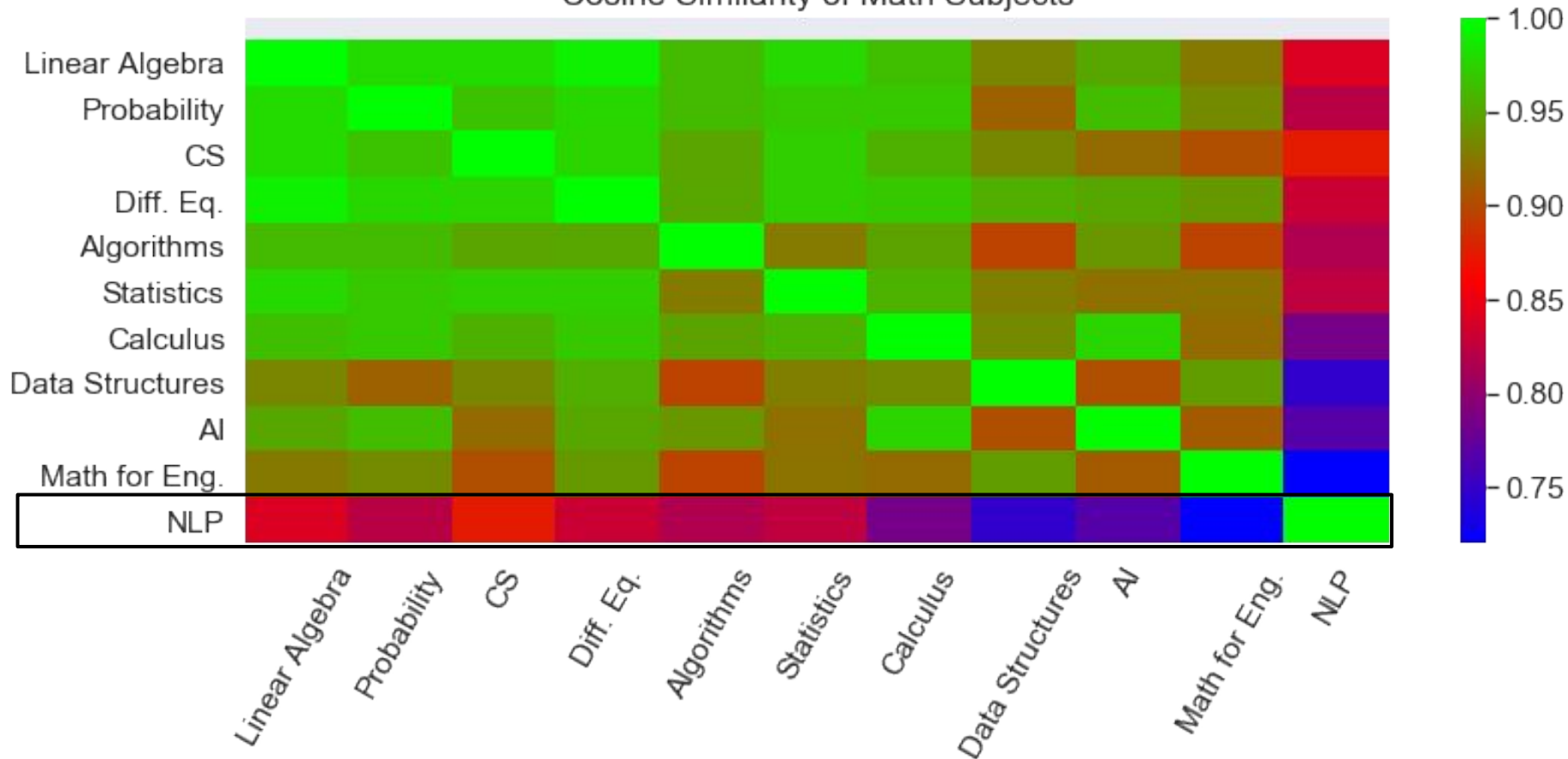


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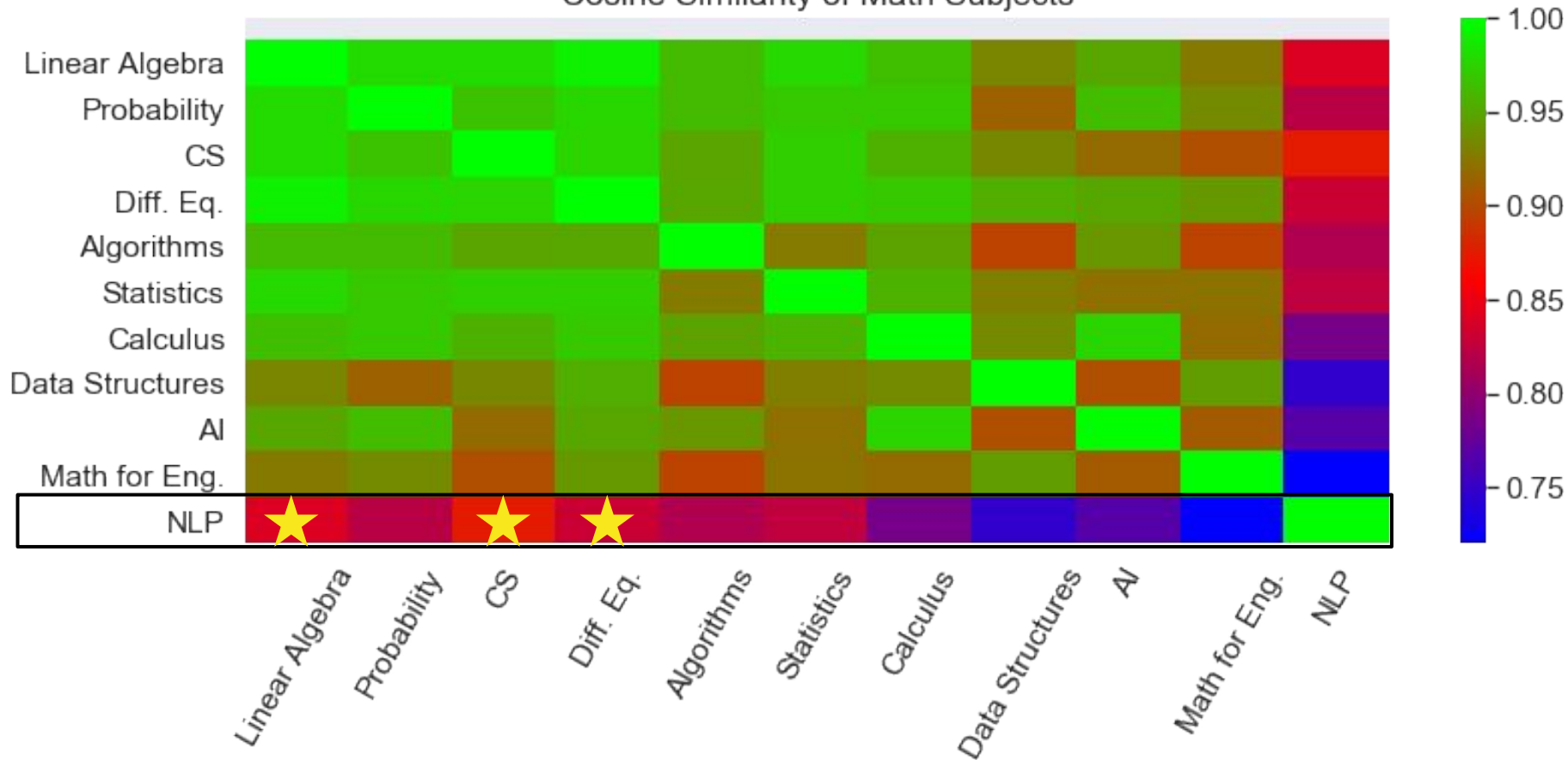




# Cosine Similarity of Math Subjects



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# Key Takeaways

1. Domain Knowledge Required
2. Some subjects are more fundamental, others are more interdisciplinary

## Future Work

- Recommendation system for math classes
- Design a curriculum leading up to learning NLP

# Thank You

Please Ask Awkward Questions

**"Science is not about  
building a body of  
known 'facts'.**

It is a method  
for asking awkward questions  
and subjecting them to a reality-check,  
thus avoiding the human tendency  
to believe whatever makes us feel good."

~ Terry Pratchett ~

