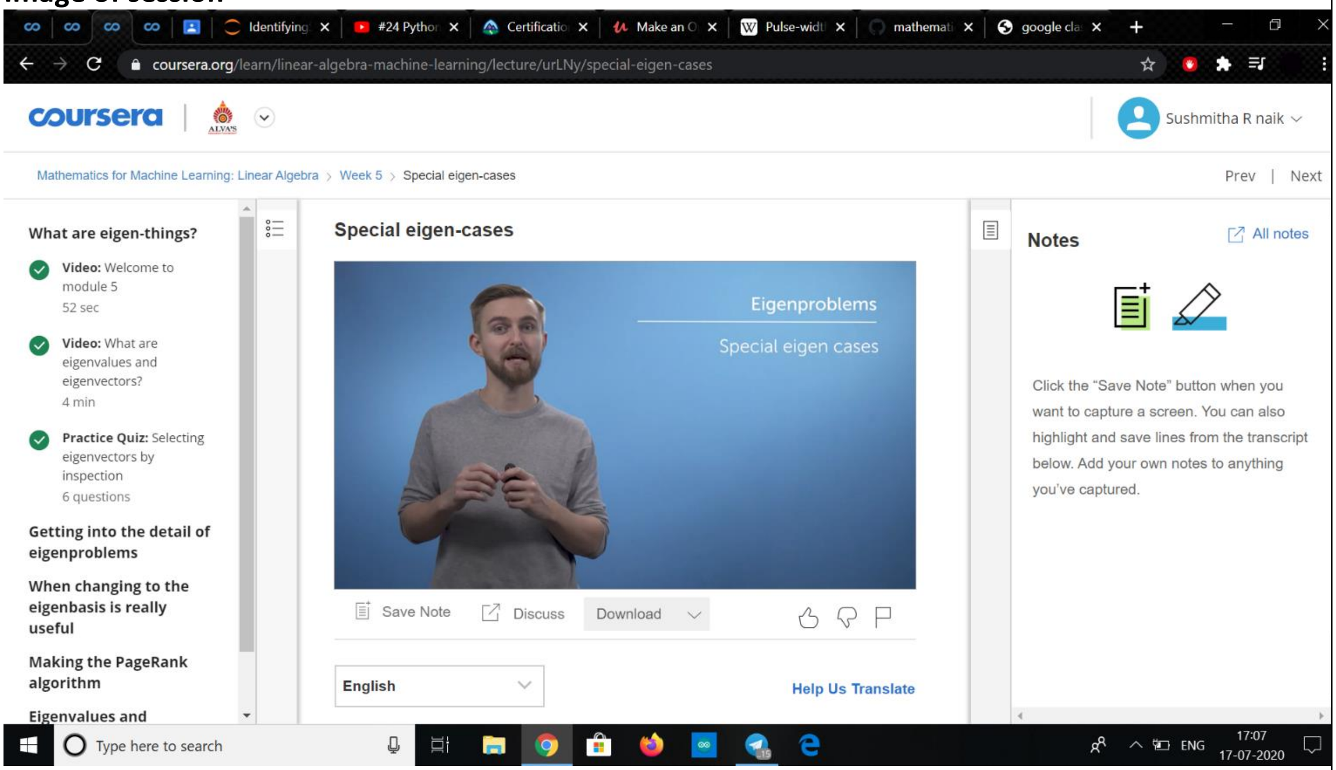
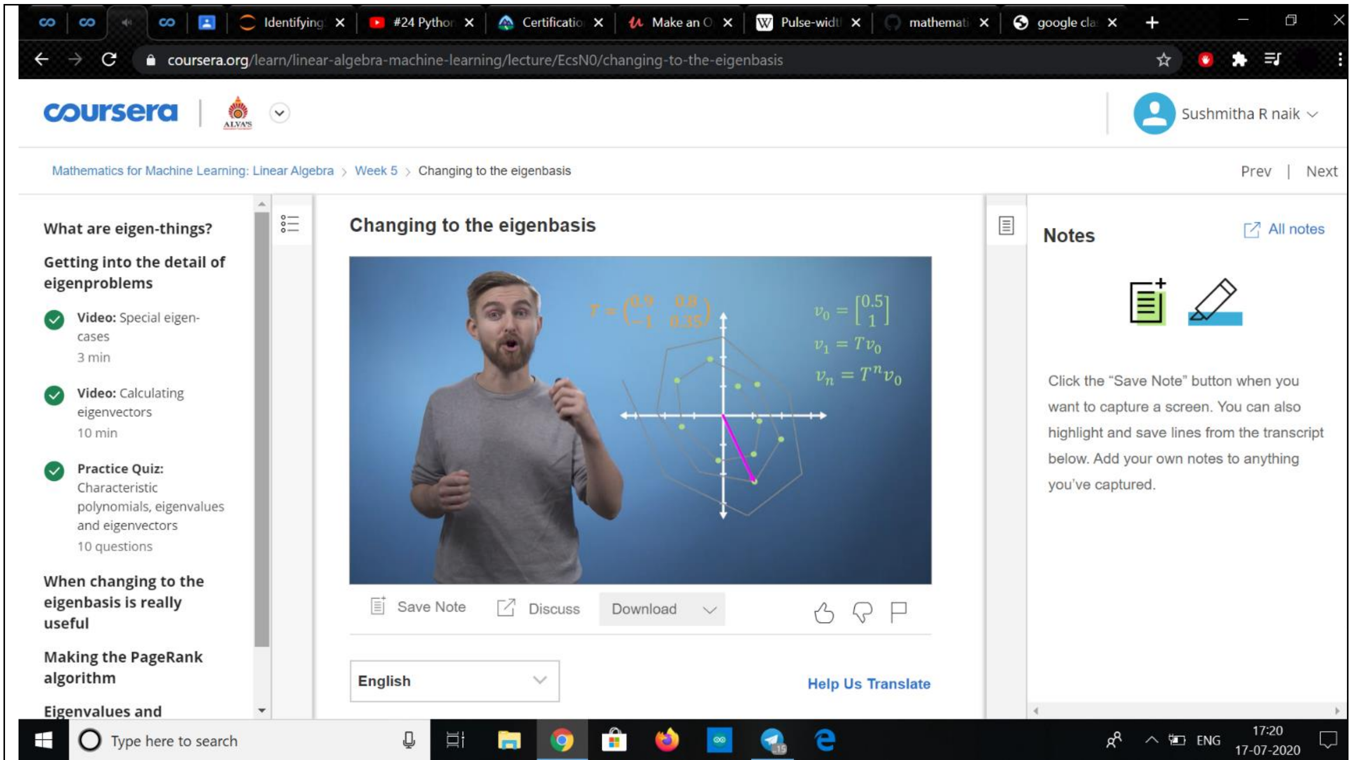
DAILY ASSESSMENT FORMAT

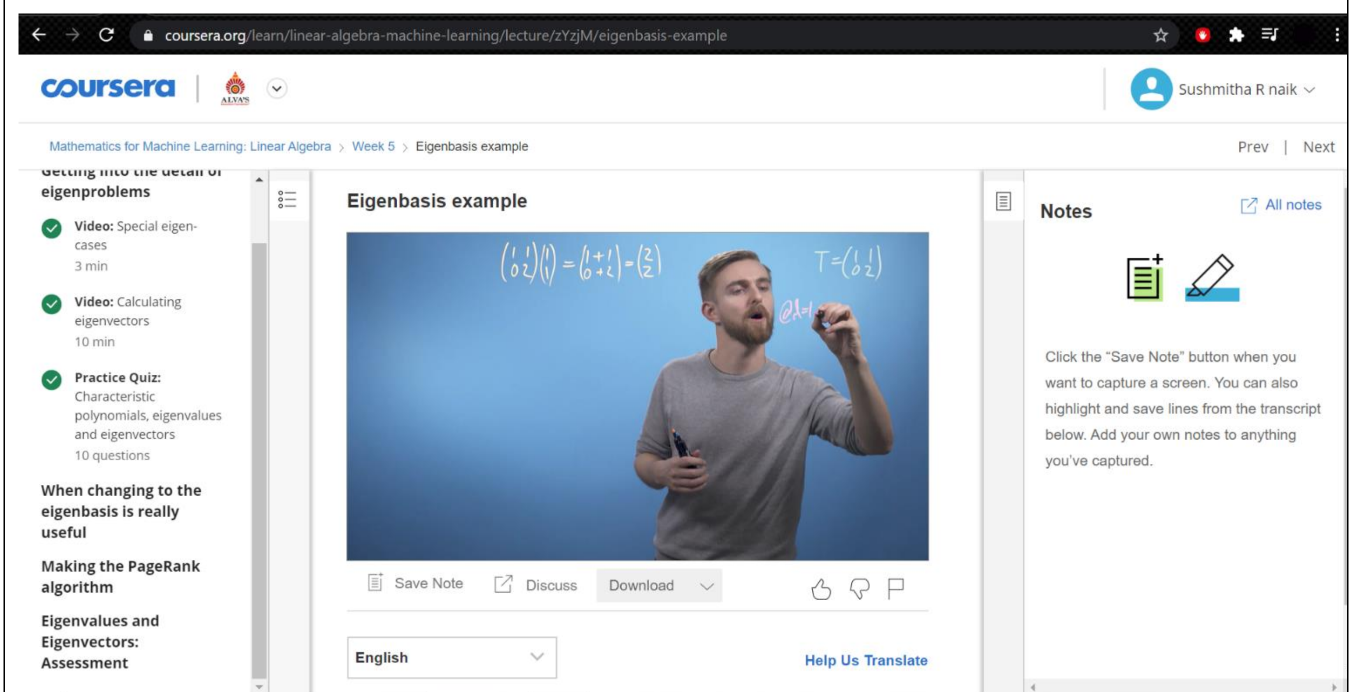
Date:	17th July 2020	Name:	K B KUSHI
Course:	coursera	USN:	4AL17EC107
Topic:	• Mathematics for machine learning: Linear Algebra • CERTIFICATE	Semester & Section:	6th sem 'B' sec
GitHub Repository:	KUSHI-COURSES		

FORENOON SESSION DETAILS
Image of session





Identifying
#24 Pytho
Certificatio
Make an O
Pulse-widt
mathemat
google cla
coursera.org/learn/linear-algebra-machine-learning/lecture/EcsN0/changing-to-the-eigenbasis
coursera
Sushmitha R naik
Mathematics for Machine Learning: Linear Algebra > Week 5 > Changing to the eigenbasis
Prev | Next
What are eigen-things?
Getting into the detail of eigenproblems
Video: Special eigen-cases
3 min
Video: Calculating eigenvectors
10 min
Practice Quiz: Characteristic polynomials, eigenvalues and eigenvectors
10 questions
When changing to the eigenbasis is really useful
Making the PageRank algorithm
Eigenvalues and
Changing to the eigenbasis
$v_0 = \begin{bmatrix} 0.5 \\ 1 \end{bmatrix}$
$v_1 = Tv_0$
$v_n = T^n v_0$
Save Note
Discuss
Download
English
Help Us Translate
Notes
All notes
Click the "Save Note" button when you want to capture a screen. You can also highlight and save lines from the transcript below. Add your own notes to anything you've captured.
Type here to search
ENG
17:20
17-07-2020



coursera.org/learn/linear-algebra-machine-learning/lecture/zYzjM/eigenbasis-example
coursera
Sushmitha R naik
Mathematics for Machine Learning: Linear Algebra > Week 5 > Eigenbasis example
Prev | Next
eigenproblems
Video: Special eigen-cases
3 min
Video: Calculating eigenvectors
10 min
Practice Quiz: Characteristic polynomials, eigenvalues and eigenvectors
10 questions
When changing to the eigenbasis is really useful
Making the PageRank algorithm
Eigenvalues and Eigenvectors: Assessment
Eigenbasis example
$\begin{pmatrix} 1 & 1 \\ 0 & 2 \end{pmatrix}\begin{pmatrix} 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 1+1 \\ 0+2 \end{pmatrix} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$
$T = \begin{pmatrix} 1 & 1 \\ 0 & 2 \end{pmatrix}$
Save Note
Discuss
Download
English
Help Us Translate
Notes
All notes
Click the "Save Note" button when you want to capture a screen. You can also highlight and save lines from the transcript below. Add your own notes to anything you've captured.

Report:

An eigenvector, corresponding to a real nonzero eigenvalue, points in a direction in which it is stretched by the transformation and the eigenvalue is the factor by which it is stretched. If the eigenvalue is negative, the direction is reversed. Loosely speaking, in a multidimensional vector space, the eigenvector is not rotated. However, in a one-dimensional vector space, the concept of rotation is meaningless.

If *T* is a linear transformation from a vector space *V* over a field *F* into itself and v is a nonzero vector in *V*, then v is an eigenvector of *T* if *T*(v) is a scalar multiple of v. This can be written as where *λ* is a scalar in *F*, known as the eigenvalue, characteristic value, or characteristic root associated with v.

There is a direct correspondence between *n*-by-*n* square matrices and linear transformations from an *n*-dimensional vector space into itself, given any basis of the vector space. Hence, in a finite-dimensional vector space, it is equivalent to define eigenvalues and eigenvectors using either the language of matrices or the language of linear transformations.

If *V* is finite-dimensional, the above equation is equivalent to where *A* is the matrix representation of *T* and u is the coordinate vector of v.

In essence, an eigenvector v of a linear transformation *T* is a nonzero vector that, when *T* is applied to it, does not change direction. Applying *T* to the eigenvector only scales the eigenvector by the scalar value *λ*, called an eigenvalue. This condition can be written as the equation referred to as the eigenvalue equation or eigenequation. In general, *λ* may be any scalar. For example, *λ* may be negative, in which case the eigenvector reverses direction as part of the scaling, or it may be zero or complex.

Linear transformations can take many different forms, mapping vectors in a variety of vector spaces, so the eigenvectors can also take many forms. For example, the linear transformation could be a differential operator like , in which case the eigenvectors are functions called eigenfunctions that are scaled by that differential operator, such as

Alternatively, the linear transformation could take the form of an *n* by *n* matrix, in which case the eigenvectors are *n* by 1 matrices. If the linear transformation is expressed in the form of an *n* by *n* matrix *A*, then the eigenvalue equation above for a linear transformation can be rewritten as the matrix multiplication

where the eigenvector *v* is an *n* by 1 matrix. For a matrix, eigenvalues and eigenvectors can be used to decompose the matrix, for example by diagonalizing it.

Eigenvalues and eigenvectors give rise to many closely related mathematical concepts, and the prefix *eigen-* is applied liberally when naming them:

- **The set of all eigenvectors of a linear transformation, each paired with its corresponding eigenvalue, is called the eigensystem of that transformation.[5][6]**
- **The set of all eigenvectors of *T* corresponding to the same eigenvalue, together with the zero vector, is called an eigenspace or characteristic space of *T* associated with that eigenvalue.**
- **If a set of eigenvectors of *T* forms a basis of the domain of *T*, then this basis is called an eigenaxis.**