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| Course: | **Coursera** | USN: | **4AL17EC093** |
| Topic: | * Mathematics for machine learning: Linear Algebra | Semester & Section: | **6th & ‘B’** |
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**Report-**

* The dot product may be defined algebraically or geometrically. The geometric definition is based on the notions of angle and distance (magnitude of vectors). The equivalence of these two definitions relies on having a Cartesian coordinate system for Euclidean space.

• In such a presentation, the notions of length and angles are defined by means of the dot product. The length of a vector is defined as the square root of the dot product of the vector by itself, and the cosine of the (non-oriented) angle of two vectors of length one is defined as their dot product.

• So the equivalence of the two definitions of the dot product is a part of the equivalence of the classical and the modern formulations of Euclidean geometry. The distance is covered along one axis or in the direction of force and there is no need of perpendicular axis or sin theta. In cross product the angle between must be greater than 0 and less than 180 degree it is max at 90degree. That's why we use cos theta for dot product and sin theta for cross product.

• The extent to which the two vectors go in the same direction, because if theta was 0 then cos theta would be 1, and r.s would just be the size of the two vectors multiplied together. If the two vectors on the other hand we're at 90 degrees to each other, if they were, r was like this and s was like this and the angle between them, theta, was equal to 90 degrees, cos theta, cos 90 is 0, and then r.s is going to be, we can immediately see, r.s is going to be some size of r, some size of s, times 0.

• If the two vectors are pointing at 90 degrees to each other, if they what's called orthogonal to each other, then the dot product it's going to give me 0.Take a little right-handed triangle, drop a little right-handed triangle down here where this angle's 90 degrees, then I can do the following.

• If we can say that if this angle here is theta, but cos theta is equal to, from sohcahtoa, is equal to the adjacent length here over the hypotenuse, that is, and this hypotenuse is the size of S. If I compare that to the definition of the dot product, I can say that R dotted with, we'll have fun with colors, dotted with S is equal to mode R size of R, times the size of S, times cos theta.

• But the size of S times cos theta if i put S up here, just need to put my theta in there, cos S, cos theta is just the adjacent side, so that's just the adjacent site here in the triangle. So, the adjacent side here is just kind of the shadow, if I if I had a light coming down from here, it's the shadow of S on R.

• Finding the modulus (size), angle between vectors (dot or inner product) and projections of one vector onto another.We can then examine how the entries describing a vector will depend on what vectors we use to define the axes-the basis.That will then let us determine whether a proposed set of basis vectors are what's called 'linearly independent