

## Re: Angles between vectors

**Source:** <http://sci.tech-archive.net/Archive/sci.stat.math/2004-10/0354.html>

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"Aleks Jakulin" <[a\\_jakulin@hotmail.com](mailto:a_jakulin@hotmail.com)> wrote in message news:<cl7tmt\$3kn\$1@planja.arnes.si>...

> *Ross Clement wrote:*

> > *Hi. I'm interested in measuring angles between vectors. I'm*

> > *aware of the standard formula for this:*

> >

> >  $A \cdot B = \|A\| \cdot \|B\| \cdot \cos(t)$

>

> *It depends on what is your goal. If your goal is classification, you*

> *should pick such a distance measure that will help you classify*

> *better, e.g., <http://www.stat.cmu.edu/~minka/papers/metric/> and the*

> *references therein. If your goal is description, you should pick a*

> *distance that captures the intuitive similarity best.*

>

> *You list several problems of metrics, and provide solutions for each*

> *of them. The 'Mahalonobis angle' metric will result if you transform*

> *the space in which A and B are vectors, and then apply your metric*

> *above. But deciding upon the transform comes under the "it depends" of*

> *my previous paragraph.*

Hmmm..... I never seem to get away with not describing my application on this group.

History: In the late 19th century and the first half of the 20th century people working in literary analysis sometimes tried to come up with a single numerical measure that described the style of an author. Nobody seriously attempts to do this nowadays, but I was just \*playing around\* with the idea. Please note my emphasis on playing around. I'm not too serious on this one.

For explanatory purposes, assume that we have two measured properties of texts (e.g. Herdan's Vm for vocabulary richness and, say, average word length, in reality the vectors would contain a \*lot\* of measures). Assume also that the data is transformed so that the average of each of the two dimensions is 0. If we have 5 books by author A and 5 books by author B then we might get the graph:

^

B | B  
| A  
A |