

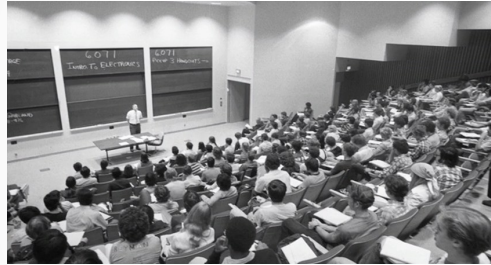
Increasing student engagement in massive open online courses

Hadi Ebrahimnejad

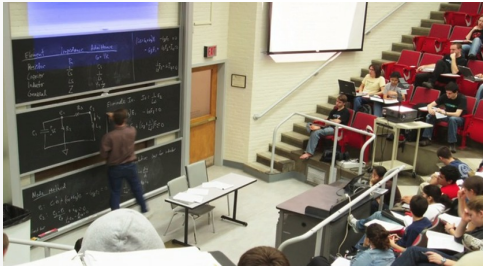
Use of technology in education

In spite of tremendous technological advancements, education hasn't really changed for centuries.

MIT (1960)



MIT (2010)



edX

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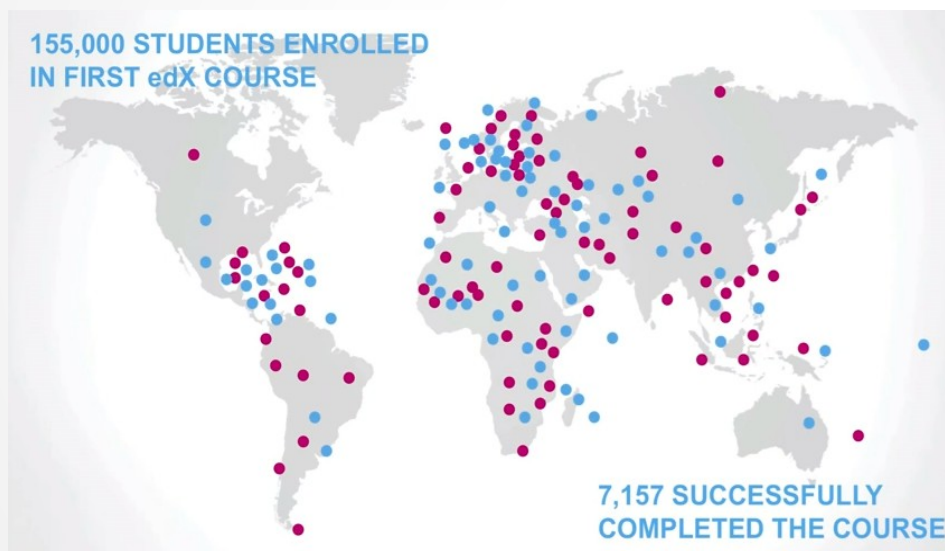
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NEWS & ANNOUNCEMENTS

Massive open online courses (MOOC)

Online technologies can transform education in both scale and access.



- 155000 registrants: bigger than total MIT alumni
- 7157 certified: 40 years of traditional lecture time

Massive open online courses (MOOC)

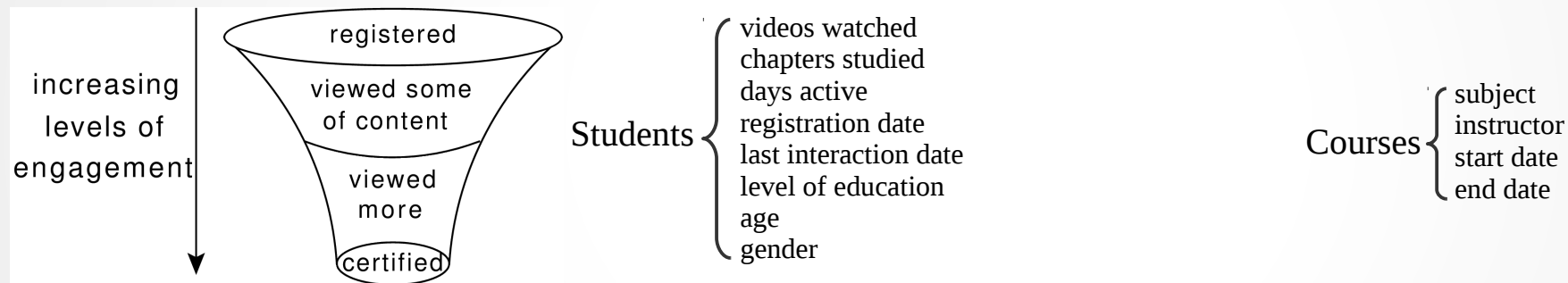
Data is aggregated from a series of 17 online courses offered in 2012-2013 by Harvard & MIT on *edX* (445000 active registrants).

Students {
videos watched
chapters studied
days active
registration date
last interaction date
level of education
age
gender

Courses {
subject
instructor
start date
end date

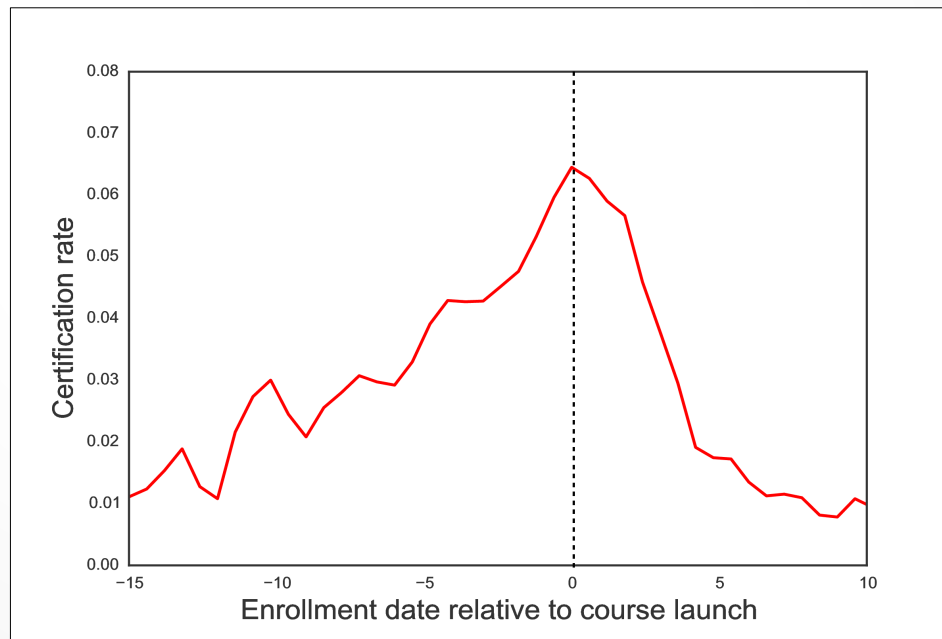
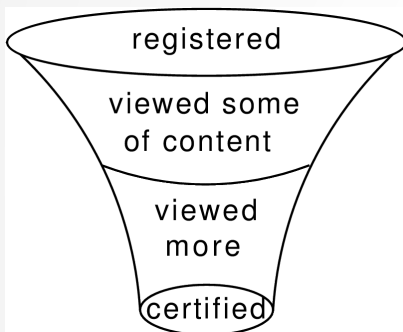
Massive open online courses (MOOC)

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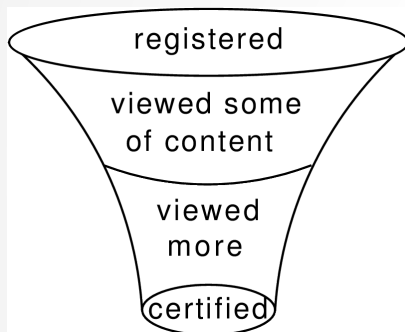
Certification vs enrollment date

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Predicting student churn

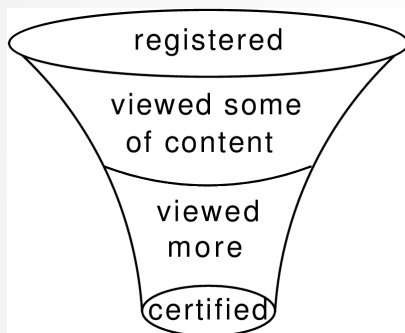
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Can we construct a churn predictor for student certification?

Predicting student churn

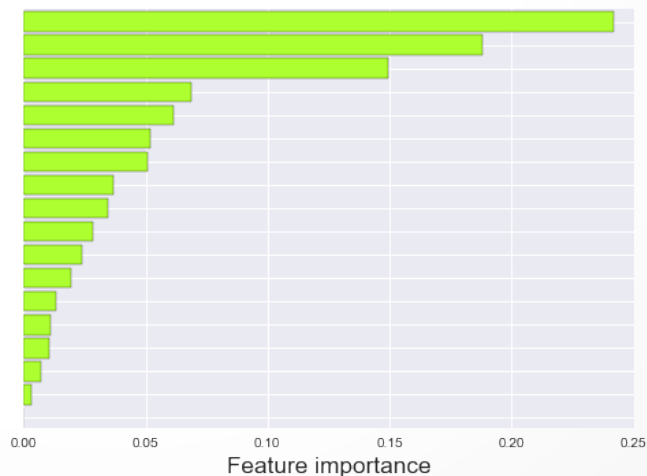
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Days active
Interactions
Videos played

Course length
Age
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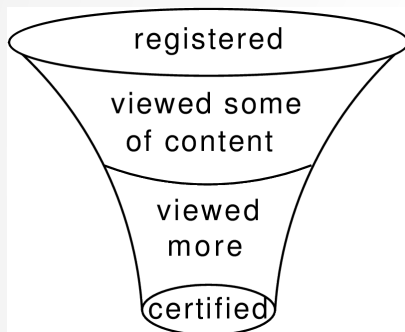


accuracy: 97%
recall: 97%
precision: 99%

RF classification of a balanced population

Predicting student churn

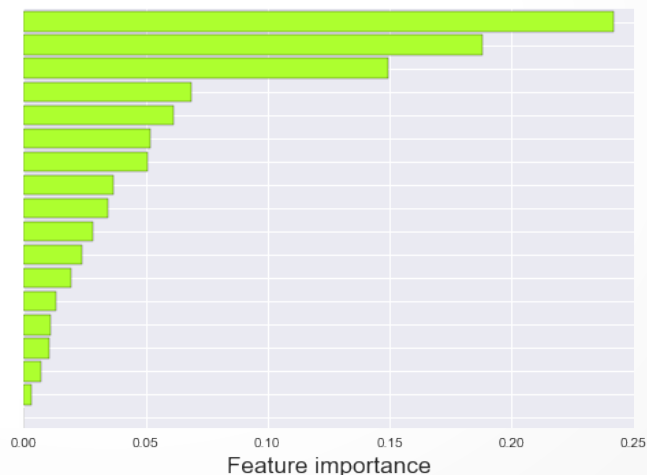
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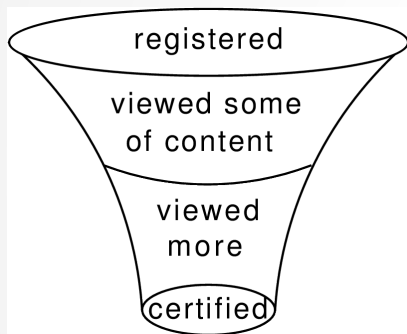


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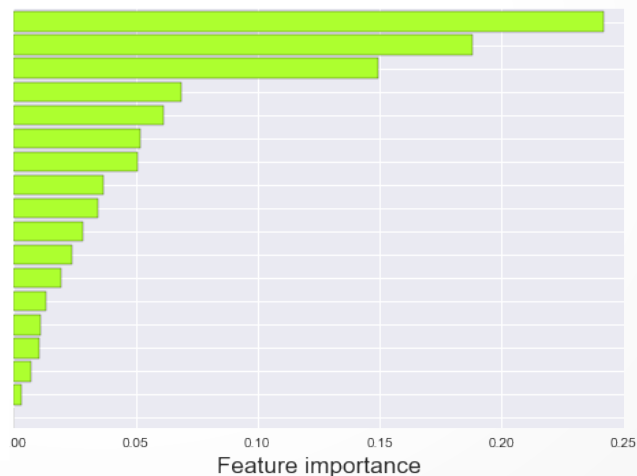
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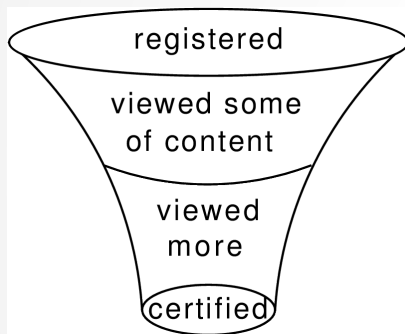
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RF classification of a balanced population

Focus on 'course view' instead of 'certification'

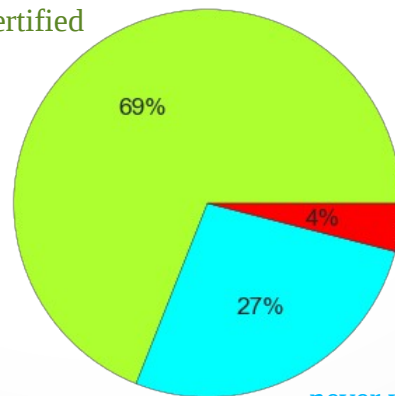
Certification rate is not a good measure of course effectiveness in MOOC:

- most students don't attend online courses to get certificates.



73% viewed
vs
4% certified

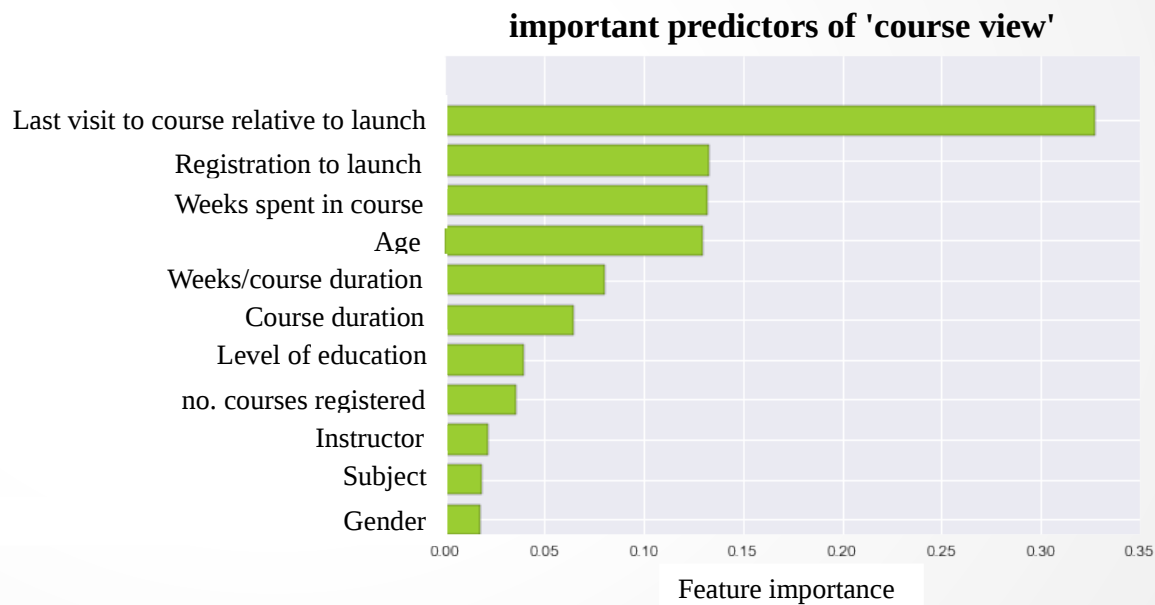
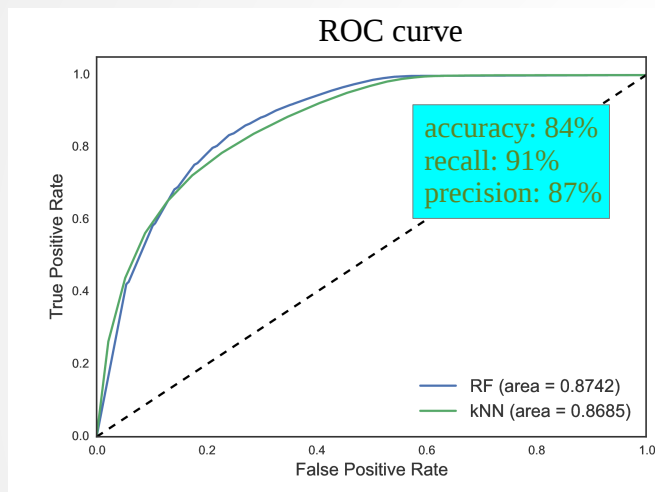
viewed, but
not certified



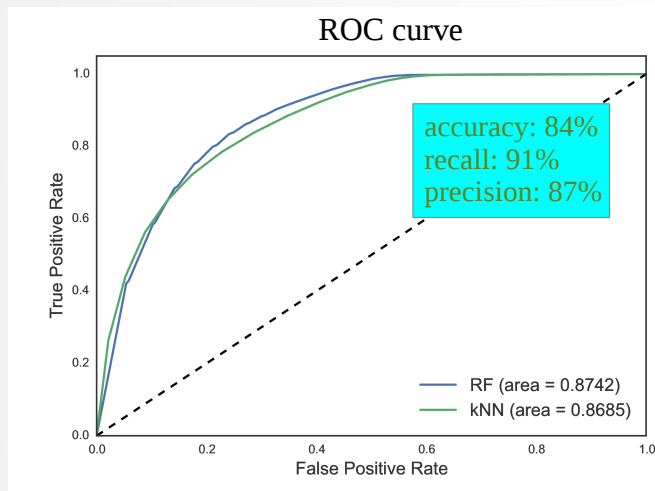
certified

never viewed

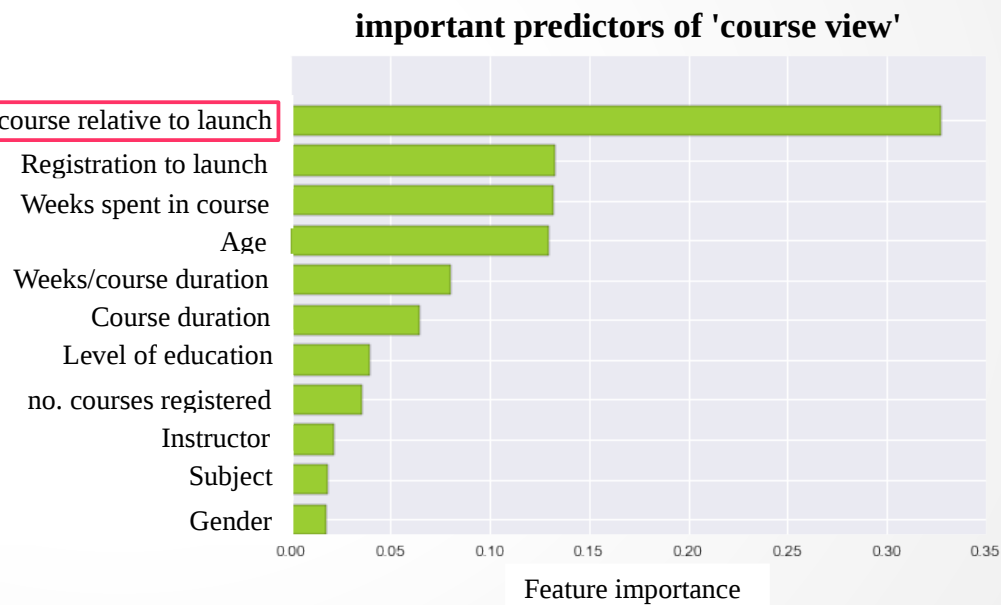
Predicting 'course view'



Predicting 'course view'

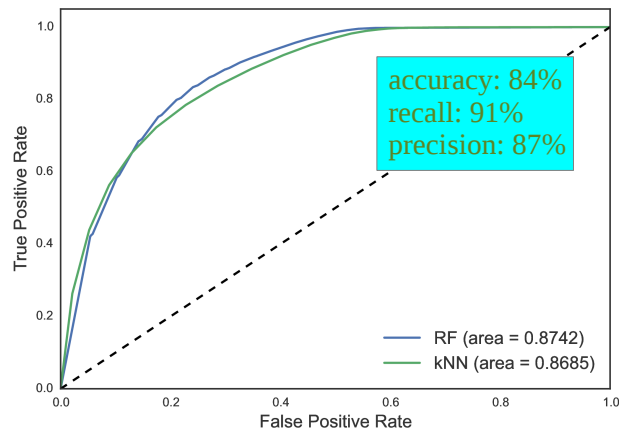


Last visit to course relative to launch



Predicting 'course view'

ROC curve



important predictors of 'course view'

Last visit to course relative to launch

Registration to launch

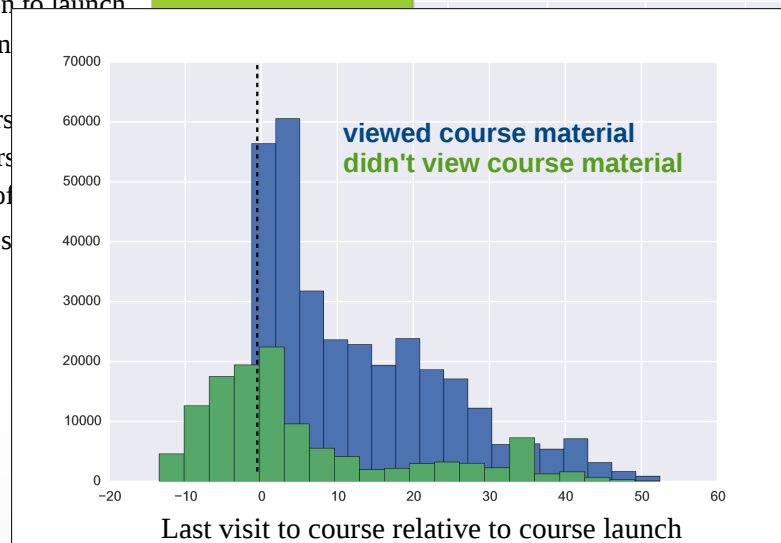
Weeks spent

Weeks/courses

Courses

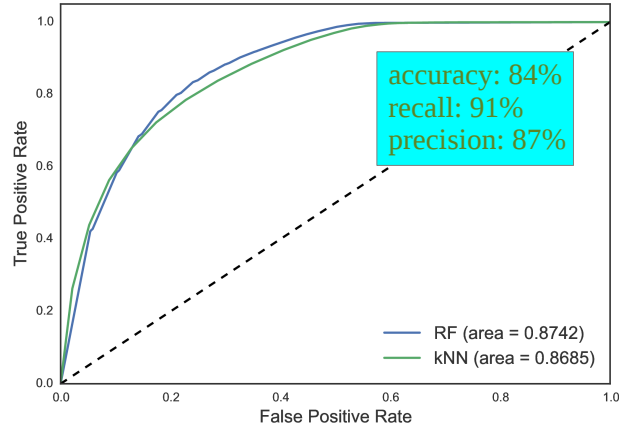
Level of

no. courses



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ROC curve



important predictors of 'course view'

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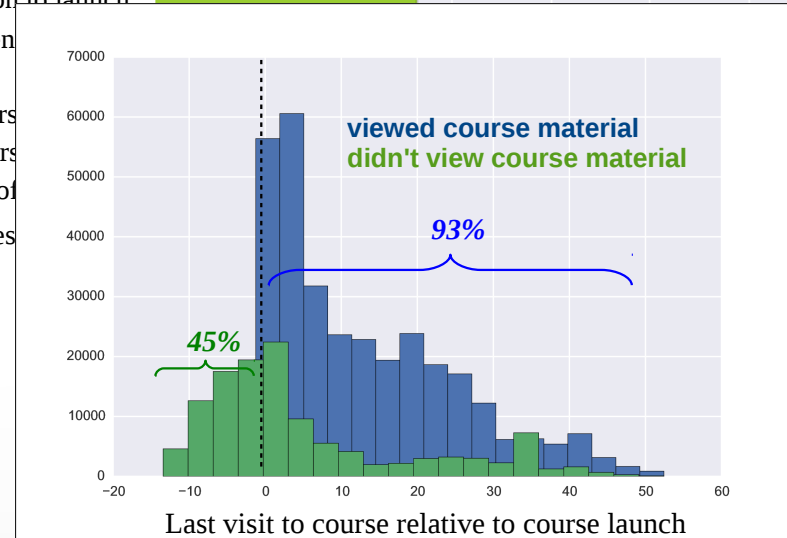
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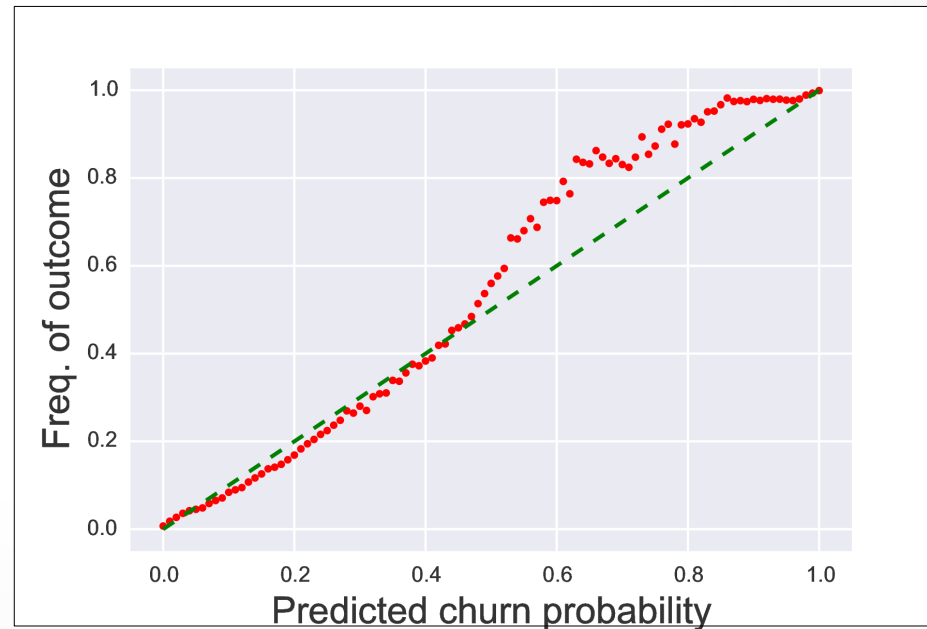
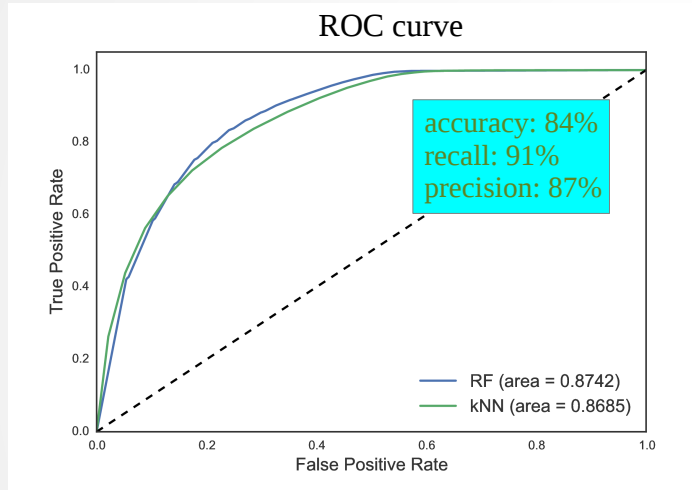
Courses

Level of

no. courses



Thinking in terms of probabilities

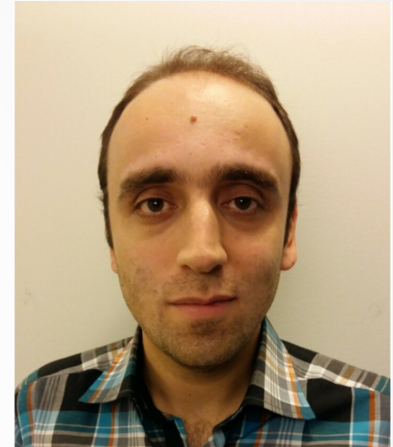
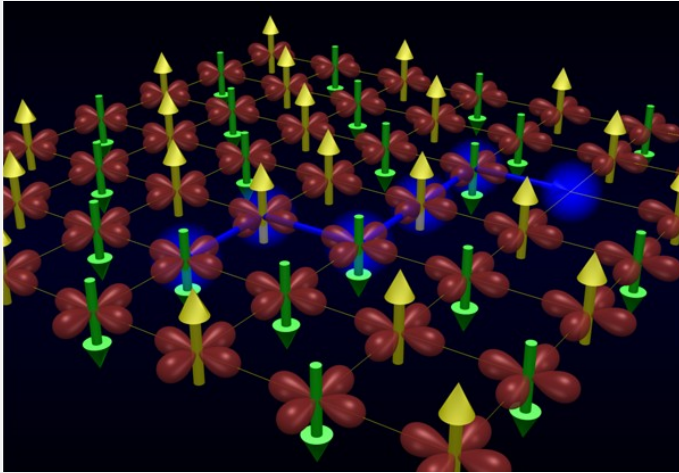




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Holes in magnetic materials

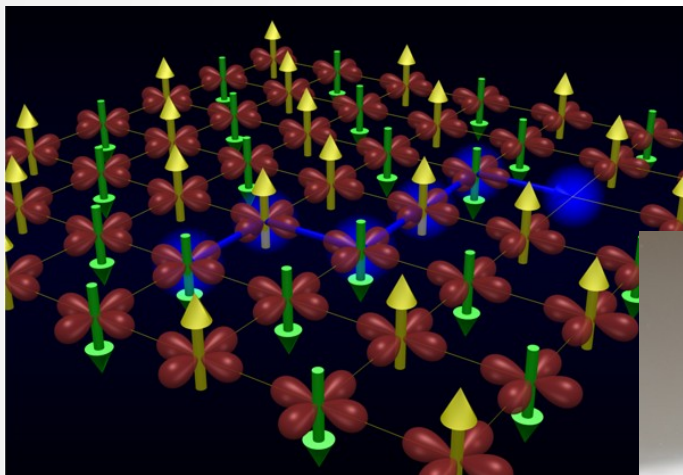




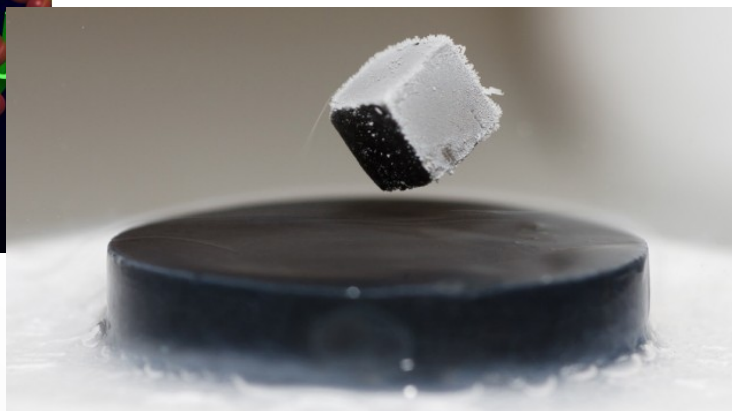
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Holes in magnetic materials



High-temperature superconductors

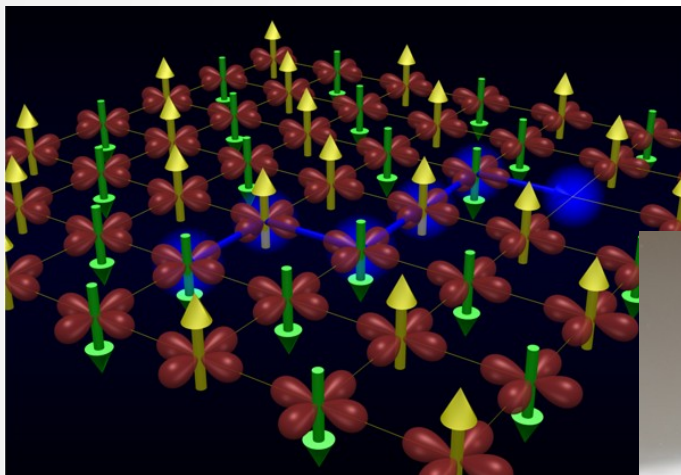




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Holes in magnetic materials



High-temperature superconductors



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ARTICLES

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The dynamics of a doped hole in a cuprate is not controlled by spin fluctuations

Hadi Ebrahimnejad¹, George A. Sawatzky^{1,2} and Mona Berciu^{1,2*}

Understanding what controls the dynamics of the quasiparticle that results when a hole is doped into an antiferromagnetically ordered CuO_2 layer is the first necessary step in the quest for a theory of the high-temperature superconductivity in cuprates.

