

Design of a diagnosis and follow-up platform for patients with chronic headaches

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Intro

Platform requirements

Mobile application

Backend and data exposure

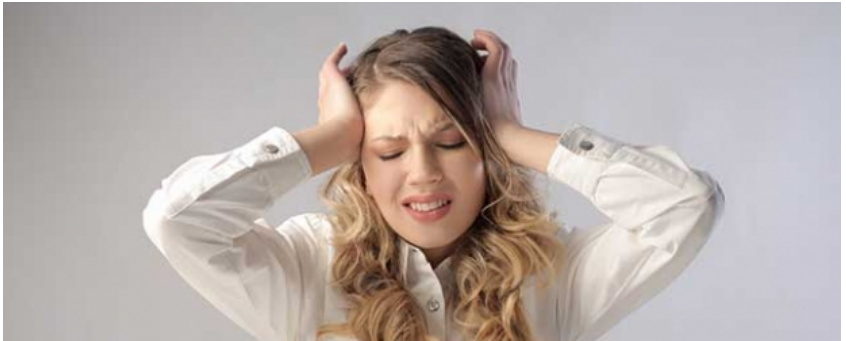
Machine learning - decision trees

Genetic merging of decision trees

Visualization - doctor dashboard

Conclusion & future work

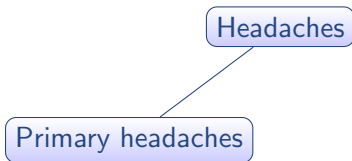
Introduction



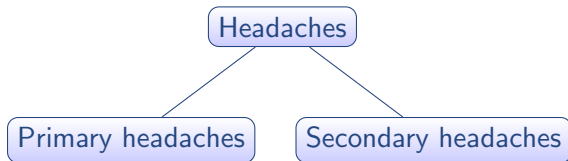
Headaches

Headaches

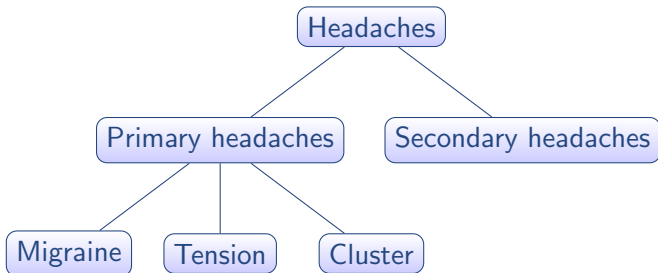
Headaches



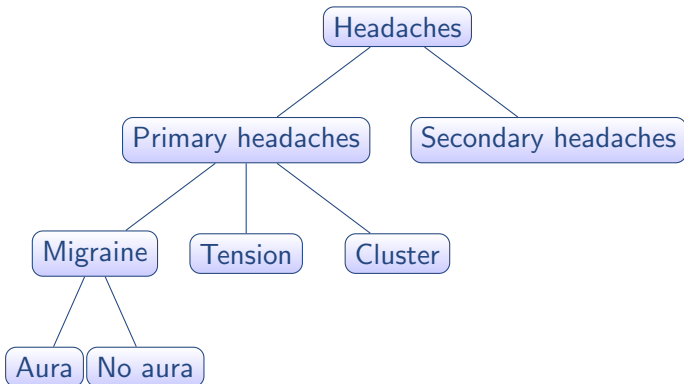
Headaches



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Many different induction algorithms



C4.5 (C5.0)



CART



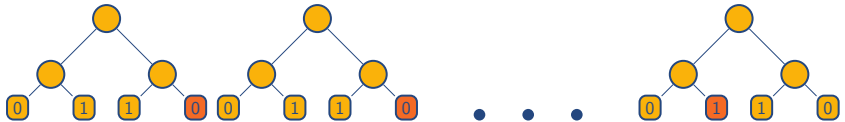
QUEST

...

→ **Which tree is the most beautiful?**

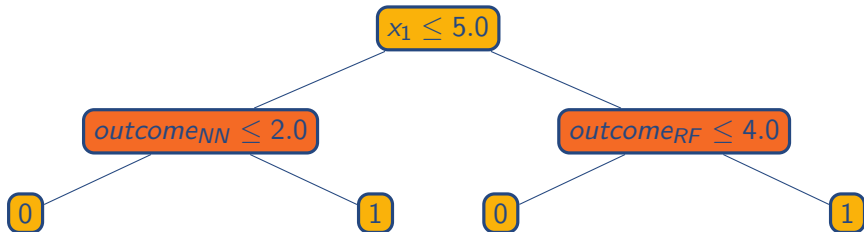
Current ensembles lack interpretability

Boosting, bagging, random forests, etc. require majority voting (classification) or mean calculation (regression) to obtain prediction



Current ensembles lack interpretability

The final decision tree obtained by **stacking** contains uninterpretable internal nodes

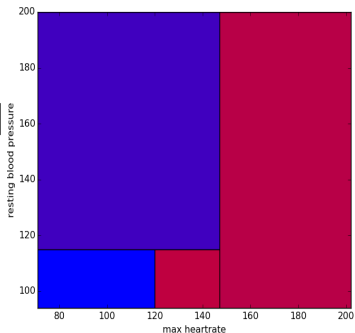
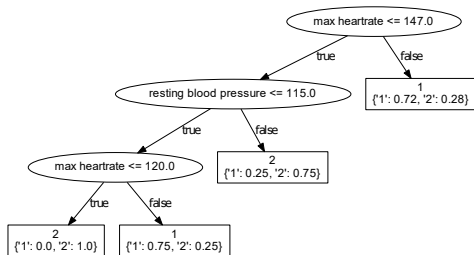


Decision tree \rightarrow decision space

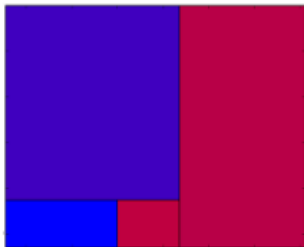
Converting decision trees to decision spaces

We can define a one-to-one mapping between a decision tree and a set of k -dimensional hyperplanes ($k = \text{\#features}$), called **decision space**. Each node in the decision tree corresponds to a hyperplane in the decision space.

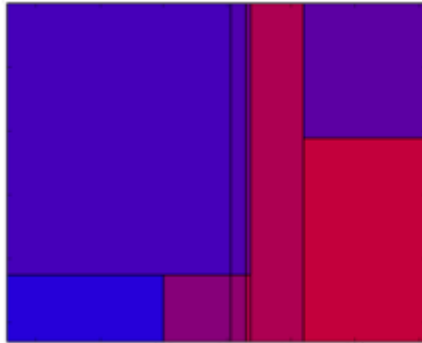
Decision tree → decision space



Merging decision spaces



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Bedankt

Bedank voor uw aandacht

No written word,
No spoken plea,
Can teach the youth what they should be,
Nor all the books on all the shelves,
It's what the teachers are themselves

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