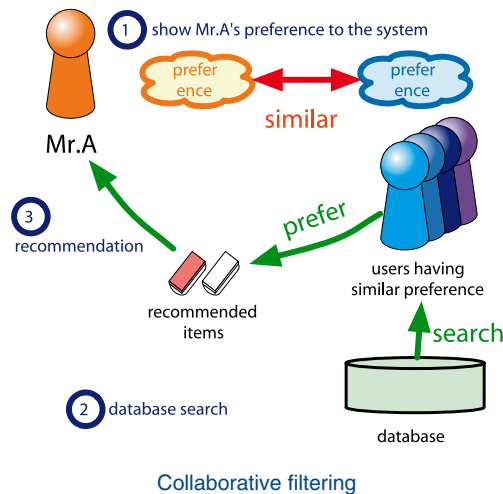


# Nantonac Collaborative Filtering Methods

- Recommendation Based on Order Responses -

A recommender system suggests the items expected to be preferred by the users. Recommender systems use collaborative filtering (CF) to recommend items by summarizing the preferences of people who have tendencies similar to the user preference (see Figure). Traditional CF algorithms adopted the Semantic Differential (SD) method, in which preferences are measured using an n-point-scale on which extremes are represented by antonyms. We propose some CF algorithms adopting the ranking method. In the ranking method, the preferences are represented by orders, which are sorted item sequences according to the users' preferences. Our methods could recommend more preferable items to the users.



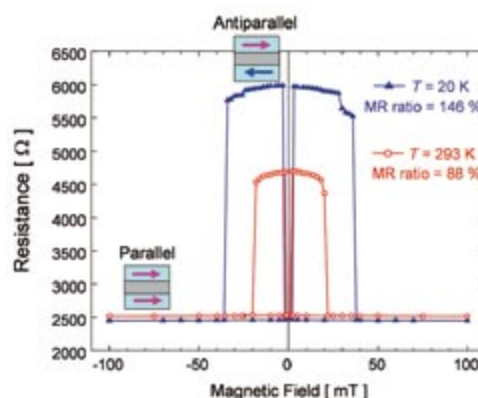
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# The Highest Magnetoresistance Achieved in Single-Crystal Magnetic Tunnel Junctions

- Key technology for ultrahigh-density MRAM -

We fabricated single-crystal Fe/MgO/Fe magnetic tunnel junctions (MTJs) and achieved a magnetoresistance (MR) ratio of 88% at  $T = 293\text{K}$  (146% at  $T = 20\text{K}$ ), the highest value yet reported. This MR ratio exceeds the theoretical limit for the conventional MTJs with an aluminum-oxide tunnel barrier. The bias-voltage dependence of the MR was very small, resulting in a high output voltage of 380 mV. This high voltage will help overcome problems in the development of next-generation ultrahigh-density MRAM.



Magnetoresistance curves of Fe/MgO/Fe tunnel junction at  $T = 293\text{K}$  and  $20\text{K}$

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