Lecture06: Evolved Representations — Details

1. Evolving Representations
2. Interlocking Evolved Genes
3. Application Example
4. Summary
Individually more efficient, genes into larger ones does make evolution of larger and more complex larger genes can also be produced by small genes. However, combining smaller overall design space, because any individuals (designs) that can be produced by answer: no. Combining smaller genes into large ones does not change the

changed by such techniques?

Question: Genetic engineer techniques can be used to evolve large genes by

Question about Evolved Representations
Often no interaction with environment.

Phenotype usually valid.

C-T transformation incompatible.

Genotype-phenotype (G-P) transformation in evolutionary system:

- Environment compatible: womb size
- High-level G-T transformation compatible: a functioning individual
- Low-level G-T transformation compatible: RNA/DNA

Genotype-phenotype (G-P) transformation in nature:

Combining Genetic Material
Recessive might re-appear.

Both are kept but only one is expressed in phenotype.

Solution: Keep conflicting Genes

Dominant and Recessive Genes
more complete genetic information for parents.

3. Helps to reduce the disruptive effect of crossover so that offspring can inherit present but potentially useful in the future.

2. Help chromosomes to "remember" (recessive) genes that are not expressed at

1. Enable chromosomes to inherit and maintain "genetic" information better.

Benefits of Using Dominant and Recessive Genes
1. Evolved gene A is removed;
2. Evolved gene C is inserted;
3. Evolved gene B stays, but part becomes dominant, part becomes recessive.

Similar problem - same solution:

**Dominant/Recessive Mutation**
Summary

1. From basic representation to evolved representation.

2. For continuous genes, normal crossover/mutation.

3. For not-continuous genes, dominant and recessive genes are needed.